

American Forests *and* Forest Life



August, 1927

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ADEQUATE FOREST FIRE PROTECTION by federal, state, and other agencies, individually and in cooperation; the REFORESTATION OF DENUDED LANDS, chiefly valuable for timber production or the protection of stream-flow; more extensive PLANTING OF TREES by individuals, companies, municipalities, states and the federal government; the ELIMINATION OF WASTE in the manufacture and consumption of lumber and forest products; the advancement of SOUND REMEDIAL FOREST LEGISLATION.

The ESTABLISHMENT OF NATIONAL AND STATE FORESTS where local and national interests show them to be desirable; the CONSERVATIVE MANAGEMENT OF PUBLIC AND PRIVATE FORESTS so that they may best serve the permanent needs of our citizens; the development of COMMUNITY FORESTS.

FOREST RECREATION as a growing need in the social development of the nation; the PROTECTION OF FISH AND GAME and other forms of wild life, under sound game laws; the ESTABLISHMENT OF FEDERAL AND STATE GAME PRESERVES and public shooting grounds; STATE AND NATIONAL PARKS and monuments where needed, to protect and perpetuate forest areas and objects of outstanding value; the conservation of America's WILD FLORA and FAUNA.

The EDUCATION OF THE PUBLIC, especially school children, in respect to our forests and our forest needs; a more aggressive policy of RESEARCH AND EDUCATIONAL EXTENSION in the science of forest production, management, and utilization, by the nation, individual states, and agricultural colleges; reforms in present methods of FOREST TAXATION, to the end that timber may be fairly taxed and the growing of timber crops increased.

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AMERICAN FORESTS AND FOREST LIFE invites contributions in the form of popular articles, stories and photographs dealing with trees, forests, reforestation, lumbering, wild life, hunting and fishing, exploration or any of the many other activities which forests and trees typify. Its pages are open to a free discussion of forest questions which in the judgment of the editor will be of value in promoting public knowledge of our forests and their use. Signed articles published in the magazine do not necessarily reflect the views of the Association. Manuscripts must be accompanied by return postage. Editorial and Publication Office, The Lenox Building, 1523 L Street, Washington, D. C.



F. W. Schmoe

THE GREAT ONES

I know such souls--a few such souls--as these,
Akin in grandeur to the lonely trees
Upon the mountain top; they breathe an air
We of the valleys are too tame to share.
They root in rock as we in well-tilled sod.
They look afar, they stand near by to God.
They vision greatness that we may not know
In sheltered quiet. When the tempests blow
The shock is theirs; they but repeat the tale
Softly unto the dweller in the vale
Who does not sense the struggle, till at last
They yield themselves up to some mighty blast,
And we small folk, who hear the groan and fall,
Say, "In the night a tree fell." That is all.

—Frances Holmstrom.

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The Return of the Forest

By BEN AMES WILLIAMS

THREE is approaching completion in a good many localities in New England a tremendous cycle. The wilderness is resuming dominion over lands which no longer suffice to support the more or less intensive cultivation of mankind. It has been my good fortune to see this process under way, to watch it progress, and to observe the effects of it in the streams and in the increasing animal life of one of these localities. I refer to the region

lying, roughly, between

Augusta and Belfast,

Maine; and more

particularly to a

tract perhaps

ten miles

square, lying from six to sixteen miles west of Belfast. The major portion of this territory is embraced in the town of Searsport.

This country was permanently settled by the whites in the early part of the nineteenth century. It was at that time uniformly clothed in forest. Except in the swamps, the prevailing growth was pine, with an admixture of spruce. In the swamps, the cedars were prob-

ably the most flourishing tree. The land
came into private ownership
through grants to Revo-
lutionary warriors.

Waldo County,
in which
Searsport



IN THE RETURN OF THE FOREST, THE
BIRCHES SERVE AS MOTHERS OF THE PINES

lies, is named after the original proprietor of the land.

The first development of this countryside was directed toward harvesting the standing timber. The valleys ten to twenty miles from the coast were tapped by roads, by a railway along which oxen furnished the motive power and traces of which may still be discovered, and by an attempt at rude canals. The process of harvesting the lumber was probably at its height from eighty to one hundred years ago, and so far as the major portion of the territory was concerned, was fairly well completed by about 1840. Before and after that date, the stripped hills and valleys passed from the ownership of the first proprietor into smaller holdings, were again subdivided, and came into the hands of that vigorous and thrifty race which farmed the new England countryside so diligently through the latter half of the nineteenth century.

The agricultural life of the region was probably at its height about 1870. It has from that time steadily declined.

When this territory was in a state of wilderness, it was, like the remainder of the North American continent,

steady clearing of the lands, and a steady decrease in the numbers of wild life. It is the testimony of men still living that about 1870 deer were practically unknown in Searsmont, and likewise the larger horned animals; and their absence meant also the absence of the beasts of prey. The passenger pigeon was either gone or going, and of the other game birds, probably the robust and adaptable partridge was the only one which held its own in any numbers.

In 1870 the population of the town of Searsmont was about 1,700. I first saw this locality in 1917. At that time the population had shrunk to about 700, and the process of forestation was already well advanced. During the intervening nine years, I have been able to watch it in progress. To wander through the woodlands in this locality now is to discover everywhere traces of a civilization which, if it is not so remote as that of ancient Egypt, is at least as definitely a thing of the past. I have come upon stone walls, crumbling and fallen, in the heart of a deep wood better than two miles from the nearest habitation.



Courtesy A. L. McCorrison

THIS IS A REPRODUCTION OF A PHOTOGRAPH TAKEN OVER TWENTY YEARS AGO, FROM THE NORTHERN SHOULDER OF APPLETON RIDGE, LOOKING TOWARD THE VILLAGE OF SEARSMONT, MAINE. THE VIEW IS largely OF MEADOWS, PASTURES AND CULTIVATED FIELDS, WITH VERY LITTLE WOODED LAND

overrun with game. The myriads of passenger pigeons had their roosts and their nest colonies here, and it is fair to presume that both upland and waterside were densely populated by the game birds which in lesser numbers have maintained up to the present their harassed existence in these localities. Fur bearing animals were present in great numbers. There were wildcats and bears and wolves, in the category of beasts of prey; and deer, moose, and caribou ranged these forests.

The period from the coming of the pioneers to about 1870 saw a steady increase in human population, a

This is an experience common to anyone who has walked through the woods of New England, but it is not always remembered that wherever a stone wall may still be found, there was once a cleared and usually a cultivated field. The stone walls were built not so much to enclose the fields as to get rid of the stones which filled the soil.

I know cellar holes, no other sign remaining of the house beneath which they were dug, and which now are lost in a thick and tangled growth. I know roads so long abandoned that trees of four and five inches



Courtesy Eastern Illustrating Company

IN STRIKING CONTRAST IS THIS VIEW MADE TODAY FROM THE SAME SPOT. THE PICTURE IS FILLED WITH BITS OF LOVELY WOODLAND—BIRCH, WITH YOUNG SPRUCE PLENTIFULLY SPRINKLED THROUGH IT. AND WHERE IN THE FORMER SCENE THE FARM AND ITS FIELDS PREDOMINATED, HERE THE FOREST HAS GRADUALLY CREPT BACK INTO ITS OWN. THIS IS TYPICAL OF WHAT IS HAPPENING THROUGHOUT ALL NEW ENGLAND, IN—"THE RETURN OF THE FOREST"

diameter now grow in their very course. And once, two miles from the nearest road in one direction and a mile in the other, I found the ruins of an old mill.

I remember in particular one piece of pasture where during the fall of 1917 I gunned for woodcock. On that first day we stopped the car at the bars beside the road, and crossing them, we came into an open field. A wood road led straight ahead of us, along the flank of a growth of spruce, the trees of which were from six to ten inches in diameter. On the left of the road, however, there was open pasture land from one hundred and twenty to two hundred yards in width, fringed on its further side by a growth of young birch, alder, and willow. About a hundred yards from the bars there was a small clump of birch, roughly circular, and perhaps thirty feet in diameter, on the left of the road; and beyond that again, a tract of open land, probably three acres in extent, running down into an alder swamp where the woodcock lay. Across this swamp the road climbed to an open hillside on which there were ten to twelve acres of land entirely free from any growth, save grass or ground pine or juniper. The aspect of this particular pasture today is so altered as to be almost unrecognizable. Just inside the bars the open land is no more than one hundred feet in diameter; and beyond what was once a small clump of birches, there is another spot

no larger which is still free from the encroachments of the new growth. The knoll across the alder swamp, in spite of the fact that the owner of the land has cut some young stuff here every year, is generally covered with a thin growth of birch. Yet this land is pastured, and the owner has made some effort to keep down the young stuff and give the grass a chance. But for his attentions and for the grazing of the cattle, what was an open field nine years ago would now be a thicket.

In the other localities this process has been allowed to go forward without hindrance. Meadows and pastures which were clear nine years ago are now good woodcock cover. And beneath the protecting foliage of the birch, alder and poplar, pine and spruce seedlings have taken root. Every New Englander knows the saying that the birch is mother to the pine. About Searsmtout it is possible to observe the tenderness of this maternity.

My friend, A. L. McCorrison, has in his possession the photograph taken twenty years ago from the northern shoulder of the Appleton ridge, looking toward the village of Searsmtout. This photograph represents a prospect of meadows and pastures and cultivated fields, with only a moderate proportion of wooded land. To stand on the same spot today is to have your view obstructed by a growth of birch, with young spruce higher than your head sprinkled plentifully through the birches. And if by shifting

your position to a higher point you overlook the same scene which twenty years ago showed everywhere the industry of man, you can see today an almost universal sweep of forest, young and old, with what meadows still remain shrinking year by year.

The population of the town in 1917 was probably above 700. It is certainly less than 500 now, and it is decreasing at an accelerating rate. When farms are abandoned, there is usually an attempt by the owners to cut the hay on them for a year or two, but at the end of that period the task becomes too difficult, and the forest is allowed to possess them unimpeded. It is possible to observe throughout the town the method which nature uses in recovering the land. Birch, poplar, and in the wetter spots alder take root at the first opportunity, and within two or three years these striplings have attained a considerable growth. By that time the pine and spruce and hemlock have taken advantage of the shelter offered them, and young seedlings begin to lift their heads. In another spot half a mile away you may see the secondary stage; the alders and the birches beginning to die of old age, the vigorous soft-woods taking their places. In many places, necessarily, oak and beech and rock maple have preempted the higher slopes, but even in these hardwood growths there is a generation of pine and spruce growing steadily taller, bringing every year nearer the day when they will begin to choke and smother the hardwoods. If the process is allowed to continue unimpeded, another fifty years will see the greater part of this town covered with a growth of lumber not unworthy to be compared with the primeval forest which stood here a hundred years ago.

The effects of this reforestation are, year by year, more and more apparent in the plentiful wild life and in the streams. There is a meadow where two brooks converge, and where I have fished each year. The lower end of this meadow is flooded in the spring and forms a reservoir of surplus water, to be used later on by mills below. In 1917 one of our party started at the foot of this meadow and fished for much of the way up through it. Nowadays, that lower end of the meadow is wholly impassable. It is flooded all summer long, and the willows have grown so thickly that even if dry footing were to be had, it would be next to impossible to thread a way through

them. In spite of the fact that there have of late been dry years, the fall sees the brooks still full of water, and the marshes and swamps are so wet that the partridges do not leave them for the higher grounds until frost skims them over with ice.

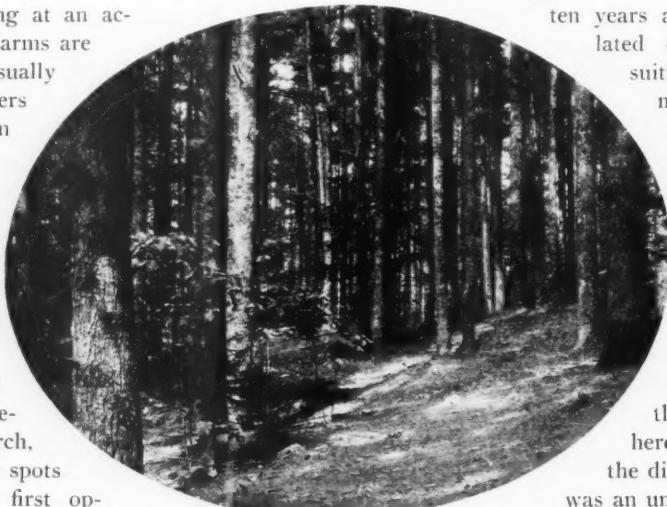
The increase in upland game birds has not been so conspicuous because of the fact that while ten years ago there were only isolated covers here and there, suitable cover now runs for miles, and by a little choosing of your way, you may walk for hours through a growth where partridge and woodcock may be found at almost any moment. But the most conspicuous aspect of the return of wild life has been the increase of the number of moose hereabouts. Nine years ago, the discovery of a moose track

was an unusual and interesting experience. The sight of a moose was a sensation. Nowadays there are moose tracks in every piece of wet ground, and the animals themselves are seen almost daily as they move to and fro from one swamp to another. One morning last fall I saw four of them within three-quarters of a mile of one another. A cow was feeding in the swamp among low birches seventy-five yards from the road. Two yearlings in an open pasture permitted me to approach within forty feet with a motion picture camera. And a large bull a quarter of a mile away only withdrew into the black growth when we moved in his direction.

Three or four years ago, for the first time in many years, wildcats were reported to have been heard. Since then they have been seen. And during the last summer, there has been at least one bear in the wilderness which forms the largest part of the town.

In another way, too, the land has been taken back by nature. Year after year the deep frosts lift and bring to the surface new boulders, and a field which was cleared and tillable land twenty years ago is today as full of stones as it was before it was cleared. Less and less land remains fit for cultivation; more and more, every year, is converted into wilderness.

In this locality, at least, it is not difficult to find comfort for the destruction of the forests in the discovery that nature, given a chance, is quick to restore them. And in the greater part of the town of Searsport and of scores of other towns of like character throughout New England, the cycle is approaching completion, and what was once wilderness is fast becoming wilderness again.



ANOTHER FIFTY YEARS WILL SEE A FINE GROWTH OF SOFT-WOOD TIMBER SIMILAR TO THIS COVERING MUCH OF THE TOWN, IF THE FORESTS ARE ENCOURAGED AND PROTECTED

Wild Life in Flood Time

How the Denizens of the Wild Battle for Survival When Flood Waters Invade Their Woodland Haunts

By STANLEY CLISBY ARTHUR

WHEN the raging Mississippi river cracked the man-made levees in the lower reaches of its course and spewed a devastating flood of yellow, silt-laden waters over the lowlands of Louisiana and Mississippi, one of the most tragic struggles for life and property in the history of the nation was enacted. Federal and State governments were taxed to their utmost to care for human beings hurried and swept from their homes by the relentless waters. Men, women and children were drawn to the safety of refugee camps; horses, cattle, sheep and swine were herded to high places to save them from the engulfing waters. But this tragedy was not confined to man and his domestic beasts.

Throughout the entire lower reaches of the river, especially

in Louisiana, another tragedy threatened. The deer and the bear, the raccoon and the opossum, the skunk and the otter, the mink and the rabbit, the squirrel and the muskrat were left to shift for themselves in this raging torrent. When the levees began buckling under the strain of the onrushing currents, the cry was for humanity, and humanity alone. Every known contrivance of man was utilized for the survival of his kind and his flock. The denizens of the wild had to rely upon their own instinct and their own cunning.

The outlook was dark for the animal life in this region and predictions were freely made that Louisiana, the chief fur-producing state of the nation, a commonwealth within whose borders more pelts of fur animals are produced an-



GRIM TRAGEDY STALKED ON THE WATERY STAGE OF THE MISSISSIPPI VALLEY. IT WAS A DRAMA OF LIFE AND DEATH AMONG THE CREATURES OF THE WILD. CAUGHT IN THE BRANCHES OF A BUSH, THIS MUSKRAT WAS LEFT TO FACE SLOW STARVATION WHEN THE WATER RECEDED



THE VANITY OF THE MUSKRAT WAS DELICATELY TICKLED BY THE FLOOD WATERS OF THE MISSISSIPPI. THIS LITTLE CREATURE SUFFERED UNKNOWN INDIGNITIES WHEN FORCED TO SACRIFICE APPEARANCES WHILE CLINGING TO A RAFT OF GRASS STALKS. BUT ON SAFER GROUND ITS FIRST THOUGHT WAS TO "FIX UP" FOR ITS RESCUERS



nually than in all of the provinces and territories of Canada combined, where the deer are numbered by thousands, and where wild turkey and quail abound, was to lose this heritage of nature. It was generally conceded that with the sweep of the flood waters the state's ascendancy as a fur-producing area would be swept away and the game birds and mammals extirpated.

There has been, naturally, a tremendous loss, but the

predicted extermination of wild life in these flooded areas has not taken place. Due to the able efforts of the conservation agents, thousands of animals in the inundated areas have been saved so that they may reproduce their kind in their favorite woodland haunts when the waters have drained off and the great river is again harnessed.

If the saving of human beings was spectacular, the salvaging of great deer herds and fur animals and other wild life was even more so. With the aid of forest rangers and representatives of the Izaak Walton League, state conservatoion agents performed a service that will go down in history as one of the greatest that has ever been undertaken in the history of wild life on the North American continent.

When the first waters rushing through the shattered Arkansas levees crossed the state line and began filling the low wooded areas of East Carroll parish, the frenzied rush of the denizens of the wild to the safety of high points began. The nimble-footed and terrified

does, bucks and fawns of the great swamp deer family found sanctuary on higher ground only to be routed again. When the Milliken Bend levee on the Louisiana territory collapsed the newly created Singer Wild Life Refuge was inundated. More than 81,000 acres were covered with a sheet of water six feet deep.

It was sink or swim for the deer. Thousands of them elected to swim to safety in the red hills of Mississippi on the east shore of the turbulent river. Fawns unable to make the journey were transported across the yellow waters by motor craft and rowboat, while back on Macon Ridge and on Sicily Island, the two Louisiana points sufficiently elevated to keep land above the flood crests, was gathered one of the most

remarkable collection of children of the wilds ever brought together since Noah made his journey over other flood waters.

Never was it better exemplified how common danger will draw together the hunter and the hunted. Men, whose chief recreation in winter was the destruction of wild life, worked night and day for the salvation of these same animals. Beasts of prey and those upon

whom they generally preyed lay down together like the Biblical lion and the lamb.

Far to the south, but a few miles from where the Mississippi emptied its flood waters into the smiling blue-green waters of the Gulf of Mexico, a great levee was dynamited to save New Orleans and the waters poured with uncanny ferociousness into one of the most valuable fur-producing areas in the country, St. Bernard and Plaquemines parishes, a region that last year produced more than \$4,000,000 worth of muskrat furs. Aquatic as this little animal is, it was unable to combat the flood that engulfed its marsh habitat and many thousands were drowned. Others breasted the waters that inundated their feeding grounds of three-square rush, cattail and bulrush and swam to the safety of the

and even the deadly moccasin snakes and other reptiles.

They knew that they were no longer hunted; they instinctively knew that man was saving them; they knew that for once the two-legged creatures saw something in them beside a pelt that would bring \$2 from the first fur buyer. To show their confidence in man in this new role, the rescued creatures would climb over the knees, laps and even shoulders of their rescuers.

This is only one side of the picture, however. Those who had the opportunity to aid wild life in their death struggles will never erase from their memories the sights that passed before their eyes. They saw a drama of life and death among the creatures of the wild. Grim tragedy, with frequent comedy reliefs, stalked on the watery stage of the Mississippi Valley. Where the tops



LEFT TO SHIFT FOR ITSELF IN THE RELENTLESS SWEEP OF MUDDY WATERS, IT WAS SINK OR SWIM WITH THIS LITTLE FUR BEARER. IT ELECTED TO SWIM FROM ONE BUSH TO ANOTHER UNTIL EXHAUSTION OR STARVATION TOOK ITS TOLL.

lower marshes where the waters leveled to those of the gulf waters.

Faced with a tremendous economic loss if the muskrat population of these marshes was to be exterminated, the trappers of the region made superhuman efforts to save the very animals they pursued so relentlessly every winter with their steel traps, and for the first time in history "life rafts" for muskrats were floated on the vast inland sea. When dynamite tore the Caernarvon levee into small bits there was no animal, large or small, more shy than the muskrat. But with the coming of the flood its fear of man disappeared. Trappers, bent on their errands of mercy, rescued thousands of them from the flotsam on which they had taken refuge. Everything that floated—logs, boards, limbs of trees, boxes, anything that was buoyant held its load of refugee "rats." Some shared their havens with rabbits, raccoons,

of cattails projected a few inches above the water, young muskrats perched precariously on the very tips while a frantic mother would splash about in the water below. The death struggle of fawns, helpless in the swift current, the antics of cub bears, no longer playful, and the last piteous efforts of raccoons, minks and rabbits to survive, presented a tragedy seldom witnessed by man.

The use of rafts by the conservation agents detailed to save wild life from being wiped out, was inspired from watching muskrats escape after their homes had been flooded. When it was manifest that the water was rising faster than these little animals could build other homes, they turned their attention to the construction of rafts out of grass stalks. At times, whole families occupied these fragile floating platforms. This display of natural instinct gave the conservation agents their idea. If the muskrats wanted rafts, why not build large ones?

The reaction of the "rats" was instantaneous. As fast as the rafts were launched they were crowded with refugees, who busily covered the boards with grass stalks for the double purpose of food and shelter. In a short time more than one thousand rafts were floating on the yellow waters, and a sufficient number of animals were

While the loss of wild life has been severe and a constant repetition of flood conditions would practically wipe out most of the birds and animals, the loss has not reached the magnitude that was first estimated. Wilson S. Holland, Assistant Director of the Division of Enforcement of the Department of Conservation of



A FLOTILLA OF LIFE RAFTS BEING ANCHORED IN THE FLOODED AREA. THIS IDEA WAS INSPIRED BY WATCHING THE SMALLER ANIMALS BUILD RAFTS OF GRASS STALKS AFTER THE FLOOD TIDE HAD EN-GULFED THEIR HOMES. THOUSANDS OF FUR BEARING ANIMALS WERE SAVED IN THIS MANNER

saved to insure "seed" muskrats for the marshes when the water subsided.

The north Louisiana breaks and the artificial crevasses in southern Louisiana were not the only embrasures that spread desolation over the lowlands. When the main stream of the river was relieved by the Atchafalaya outfall, the levees holding this outfall in check cracked under the strain of the unprecedented high stages and a whole section of central Louisiana found itself battling the muddy waters. Came again a struggle of the wild folk, along with the humanity of these bottom lands. Again those entrusted with the conservation of game birds and mammals were put to the test and deer and fur animals were herded to high points and fed. The exodus of the deer and bear to the southern marshes and ridges kept pace with the relentless sweep of the flood tide, but many were trapped by the muddy waters. Hardly fifty per cent survived. Submerged barbed wire fences added greatly to the destruction of the fleeing animals, many being held fast in the cruel barbs while the muddy waters rushed over them. Millions of crawfish attacked the legs of the deer that were forced to stand in deep water for days before the fleet of pirogues and motor boats could come to their rescue. Shallow draft luggers, with capacious holes, were pressed into service and the animals removed to high ridges.

Louisiana, who directed the relief work in most of the state, estimates that the actual loss will not exceed twenty-five per cent of the deer with a smaller percentage for the fur animals.

This loss of wild life, however, whatever its percentage is finally decided upon, indicates that those who will take up the flood problem must consider the effect these inundations will have on the game and fur animals. Not only have they sufficient economic importance to the country at large to make the problem national in scope, but their value to the sportsmen, and their sentimental value to the people earns for them the right of survival.

In many places in the interior, after the flood waters have subsided and there is a return to normal, the wild life of the Mississippi Valley will replenish their kind. But this will take time and vigilant protection. It is quite true that before man and his levees appeared in the Mississippi delta country the whole lower river region was subjected to annual inundations and that the deer, bear, squirrel, rabbit, mink, muskrat, and all of the wild life that make up the Valley's remarkable fauna, were here in larger numbers than they are today. But there is no argument against the fact that a recurrence of such a tragedy as the recent Mississippi Valley flood may doom the remnants of the South's wild life.

Forestry in Idaho's White Pine

The Clearwater Timber Company Embarks Upon a Program of Permanent Forest Management

By F. G. MILLER

IT is a matter of more than passing interest to note the part Idaho timber owners are playing in the promotion of forestry. For a number of years they have given protection to young growth on cut-over and burned-over lands, and as a result a large part of these areas are adequately restocking. Under the present Idaho forestry law, continuous growth and protection on forest lands is still further assured.

Within the past year, one large company operating in white pine, made a survey of 47,000 acres of cut-over land to determine the character and amount of young growth. The study revealed 54 per cent of this area to be satisfactorily stocked.

Three other large companies have called in consulting foresters to map out plans for the management of their cut-over lands. The largest company in the state operating in yellow pine recently raised the diameter limit to which it had been cutting, believing the change to be better silvicultural

practice. Residual stands, advanced growth and reproduction are receiving increasing attention.

The Clearwater Timber Company, of Lewiston, Idaho, a Weyerhaeuser affiliation of which J. Philip Weyerhaeuser, Jr., is the general manager, is now opening up the largest contiguous body of white pine in Idaho, and

incident to the enterprise there is represented one of the largest lumber developments in the Northwest. Associated with the Clearwater company in this development are the Pacific Power and Light Company, and the Northern Pacific and Union Pacific railroad companies.

The construction program includes the building at Lewiston of a strictly modern mill with an annual capacity of 200,000,000 board feet; the installation of a dam across the Clearwater River to develop electrical power for the mill and to create a log storage pond; and the construction of forty-one miles of standard railroad from Orofino to the heart of the company hold-

ings. The total cost of the milling plant, the power dam and railroad extension will be approximately \$11,000,000.

The timber belt to be opened up by this project comprises the company holdings now approaching 200,000 acres; 125,000 acres more belonging to other corporations and individuals; 125,-



THE HEADQUARTERS CAMP OF THE CLEARWATER TIMBER COMPANY IN THE HEART OF THE WHITE PINE BELT OF IDAHO. IT IS IN THIS REGION THAT THE COMPANY HAS ADOPTED A PROGRAM OF FORESTRY WITH A VIEW TO CONTINUOUS OPERATION

000 owned by the State of Idaho, and a vast area of National Forest timber which will eventually come out through the Lewiston gateway.

Due to the strategic position held by the Clearwater company in this development program the managers have adopted a plan of cutting with a view to continuous

operation. Many factors favor such a plan. Owing to the mild climate, abundant precipitation, and productive soil the white pine forest here is heavy, grows rapidly and the timber is of high quality. For the most part the Clearwater lands as well as most of the surrounding forest areas are non-agricultural in character and are more valuable for the production of timber than for any other purpose.

In addition to the western white pine, the western red cedar, western larch, Douglas fir, white fir and Engelmann spruce are found in this area. White pine is the principal lumber tree, red cedar finds a ready market for poles, larch and Douglas fir are in demand for ties. White fir and Engelmann spruce are good lumber products at present, but will doubtless command a better price for pulpwood.

Horse logging, a method conducive to good silviculture, will prevail, and close utilization will be favored by the fact that the bulk of the logs will be transported to the mill by rail rather than by river driving. Plans for cutting call for a twelve-inch breast-high diameter limit and the slash will be piled and burned as logging progresses.

The company began logging in September, 1926, in second growth white pine 80 to 100 years old that is cutting out better than forty thousand feet to the acre. Preliminary surveys by the Idaho School of Forestry indicate that with care in logging sufficient trees eleven inches in diameter and under would be left to furnish a profitable second cut in 1961. Six weeks after cutting began the school ran thirty strip acre surveys through representative cut-over areas recording all residual trees by species and diameter classes. These surveys revealed that an average of 97 trees per acre, eleven inches and

below in diameter were being left. Of these 30 per cent was white pine, 50 per cent white fir, 10 per cent cedar, and 10 per cent Douglas fir, larch, lodgepole pine and Engelmann spruce.

Just what the mortality per cent of this residual stand in 35 years will be is, of course, problematical. There is some apprehension as to loss from windfall, but the evidence at hand from studies of residual stands of western white pine made elsewhere would indicate that loss from this cause will be nominal. In fact, loss from any cause in the residual plots studied has not been serious, and that which has occurred has been caused not by windfall but mostly by sunscald. A number of permanent sample plots have been laid out in the residual stands of the Clearwater company in order to determine definitely the mortality per cent of the trees, rate of growth and yield. If the losses in these residual stands are as light as they have been in the white pine stands studied in other parts of north Idaho, the predicted cut in 35 years is around 12,000 feet, about 30 per cent of which will be white pine. Assuming no loss by logging or from other causes the predicted cut in 35 years is about 19,500 feet, hence the yield of 12,000 feet represents a loss of nearly 40 per

cent incident to logging alone, a figure which may be materially reduced with greater care in the woods operations.

By saving and protecting the trees below merchantable size, timber of high potential value is left for a second cut to prolong the operations of the Clearwater company, if not to make it possible to run indefinitely. No company in Idaho, and few if any in the Northwest, has a more promising outlook for a con-



DUE TO THE MILD CLIMATE, ABUNDANT PRECIPITATION, AND PRODUCTIVE SOIL THE WHITE PINE FORESTS OF IDAHO GROW RAPIDLY AND THE TIMBER IS OF HIGH QUALITY. THE FORESTRY PLAN OF THE CLEARWATER COMPANY WILL MAKE POSSIBLE A SECOND CUT OVER THE VIRGIN AREAS IN THIRTY-FIVE YEARS



MORE THAN A HALF MILLION ACRES OF WHITE PINE FOREST WILL BE OPENED UP BY THE CONSTRUCTION OF FORTY-ONE MILES OF RAILROAD FROM OROFINO TO THE HEART OF THE CLEARWATER HOLDINGS

tinuous operation. If this goal can be realized, no portion of the heavy investment will need to be charged off at some time in the future. Furthermore, the applica-

tion of the elusive compound interest principle to the cost of growing timber will not be necessary.

Fire hazards will be reduced by the piling and burn-



LOGGING IN SECOND GROWTH WHITE PINE EIGHTY TO ONE HUNDRED YEARS OLD. THE CLEARWATER PLANS FOR CUTTING PROVIDE FOR A TWELVE INCH DIAMETER LIMIT AND THE BURNING OF SLASH AS LOGGING PROGRESSES

ing of the slash as logging progresses and by residual trees in that by furnishing partial ground cover they will conserve the soil moisture and will help to retain the fire retardent vegetation instead of allowing it to give way to fire feeding vegetation. Too much stress can not be laid on the importance of leaving the ground at least partially shaded with green trees as a fire preventive measure.

The leaving of residual stands gives almost certain assurance of adequate reproduction within a reasonable period after logging, and reproduction affords additional fire protection by the ground cover it furnishes. Reproduction studies made by the Idaho School of Forestry under residual stands of western white pine on other holdings revealed an adequate restocking in all

cases after 15 to 18 years from time of logging, and showed quite conclusively that reproduction had come from seed borne by the residual trees rather than from seed stored in the duff.

Communities, both town and country, directly benefiting by this new developing lumber enterprise are all taking on renewed activity. There is no evidence of a boom, but rather the manifestation of a gradual, substantial growth, and all are looking forward to a continuous industry. Incidentally it may be added that tributary to Lewiston is a permanent forest area aggregating more than 5,000,000 acres, said to carry 35,000,000,000 board feet of merchantable timber. These vast timber resources will make this thriving city one of the great lumber centers of the entire West.

MOUNTAIN MEADOW

We did not know a mountain's face
Concealed an interval of grace
Such as this meadow where we stood
Suddenly in blue Monkshood,—
This heart-deep, sunlit pool of bloom
Buried in the forest gloom,
Cedargirt and canopied
By the sky's blue curving lid,
Its surface ruffled by the thinned
Snow-cooled, heady mountain wind,
Where as we gazed, to our surprise,
Spindrift of blue butterflies
Arose in iridescent showers,
Then settled back upon the flowers—
Blue wings—petals! We were given
A momentary glimpse of heaven,
And a bond across the years
Of beauty shared, and tears—and tears—

—Ethel Romig Fuller



TRAMPING IN THE GREAT SMOKIES

By *Laura Thornborough*

DESPISE THEIR WILDNESS, THE GREAT SMOKIES ARE THE FRIENDLIEST MOUNTAINS IN THE WORLD

*With illustrations by the author**

"**I**F hit's mountains you want you've shore got 'em here, just as many as your eye can look at." My Smoky Mountains guide settled himself on a rock, took a chew of tobacco and gazed contentedly about him.

It was my first trip to Siler's Bald, one of the noteworthy peaks on the high central range of the Great Smokies, which for sixty miles marks the boundary between Tennessee and North Carolina, and I was standing practically in the center of the proposed Great Smoky Mountains National Park area.

The guide was right. There were mountains all around us, more than the eye could see or the mind could comprehend. I was standing at the apex of a dome-shaped grassy meadow several acres in extent, fringed with a grove of beeches dwarfed by wind and weather.

Looking out over an unending sea of mountains tumbled and massed confusingly, I suddenly realized that "Top of Smoky" as the main divide is affectionately called by the mountain people, is literally the tops of many high ridges, which branch off into North Carolina and Tennessee and are connected by other mountains or narrow ridges.

To reach Siler's Bald we had motored fifty-two miles from Knoxville to Elkmont, through Sevierville, up the

gorge of Little Pigeon to Gatlinburg and over Sugarland Mountain, climbing from 900 feet at Knoxville to 2,400 feet at Elkmont, where the real climb begins. We took the Dripping Rock Hill trail up Miry Ridge, then followed the top of the ridge to where it "heads up on Smoky."

Dwellers in the North or East who aspire to real mountain climbing need not travel to the Alps or Apennines, to the Rockies or Sierras, for Miry Ridge and Siler's Bald and Mt. Le Conte are less than a thousand miles away, half that from the National Capital.

Almost at the front door of two thirds of the population of the United States is a land of primeval forests, beetling cliffs, sheer precipices and high mountains, some of them still unnamed and unexplored. In the wildest sections of the Great Smokies impenetrable forests, jungles of laurel and rhododendron, unscalable cliffs, bar the way of the would be explorers.

To reach Siler's Bald I had climbed all of eight miles, part of it up what seemed like a deep well lined with wet, slippery, moss-covered rocks. On top of the ridge I found a deep, rich loam into which I sank over my shoe-tops when I skated off the roots of rhododendron which formed an arch over head. But those hours I spent on Siler's Bald in silent contemplation of Nature's masterpieces well repaid me for the climb. Here was unbelievable wildness and grandeur; here were a

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hundred thousand acres of virgin forests, the largest hardwood forests left in eastern America.

The Great Smokies are the friendliest mountains in the world. Their wild and untamed beauty enchants and allures. They are high mountains as measured from their base level of fifteen hundred feet, as high above the surrounding country as many of our western peaks, measured from a base level of from four to nine thousand feet. Yet the Great Smokies, unlike the other high mountains of the world, are timbered to the top. This is their great charm.

For five days and four nights I camped on top of the Great Smoky Divide, walking from one high peak to another, camping when night overtook me under the lee of some high rock peak or in a park-like grove of beeches, carpeted with moss, ferns and myriads of wild flowers. My bed was the luxuriant grass of a "bald", or fragrant balsam boughs. The sky was my roof. Blankets and a camp fire at my feet were welcomed even in August on top of Smoky. This is not surprising when one remembers that for twenty-eight miles the central ridge rises a mile or more above sea level.

This is the land destined to become our twenty-second National Park, our greatest National Park in the East both in extent and grandeur. Robert Sterling Yard writing in the National Parks Bulletin says: "Great Smoky's contribution to the nation's world-famous exhibit will be large. The fundamental purpose of the National Parks system is two-fold; it is at the same time our national museum system of the untouched American wilderness in all its manifestations, and our national gallery of scenic master-

pieces. To both functions the Great Smoky area will add importantly since it will represent Appalachian land forms and primitive forests in their highest splendor and perfection." There seems to be much misunderstanding in regard to the National Park situation. By an act of May, 1926, 704,000 acres lying partly in Tennessee and partly in North Carolina were designated as a suitable park site. This land is privately owned and must be privately purchased as the government buys no land for National Park purposes. With funds raised in state campaigns the work of buying up this land when and where it could be obtained at a reasonable price has been going on. The Carolina and Tennessee legislatures have passed bills appropriating two million dollars each for the purchase of park lands.

When as much as 428,000 acres have been acquired and approved by the Park Commission and National Park Service and officially accepted by the Secretary of the Interior a great National Park in the East will be an accomplished fact.

Most of our National Parks have been created out of the public domain and are the nation's gifts to the people. If the Great Smokies become our next National Park they will be the people's gift to the nation, a wonderful gift that millions may enjoy, instead of the hundreds that have found this natural wonderland.

Scientists have proclaimed this a geologist's laboratory, a naturalist's paradise. Here the student of geology can see evidences of erosion, change of land levels and faulting not found elsewhere, for no other region shows so many different phases of geological work and change.



THE HARDWOODS REACH THEIR GREATEST GROWTH AND LUXURIANCE ON THE WELL-WATERED SLOPES OF THE GREAT SMOKIES. THERE ARE YELLOW POPLARS GROWING, TALL AND STRAIGHT, EIGHTY FEET TO THE FIRST LIMB AND TWENTY-FIVE FEET IN CIRCUMFERENCE

erosion, change of land levels and faulting not found elsewhere, for no other region shows so many different phases of geological work and change.

The Great Smokies are among the oldest mountains on the continent if not in the world. Here the student of geology can see where uplift has renewed the streams. Little River with its forks and prongs, carving its way through the central ridge shows where it is older than the last uplift. Here are forests of amazing variety, reaching their greatest growth and luxuriance on the well-watered slopes of the Great Smokies. Here are murmuring pines and hemlocks, of which the poet sings; here, too, are numerous oaks, hickories, chestnuts, gums, ash, locust, walnut, butternut, hornbeam, linn, basswood, buckeye, redbud, dogwood, sycamore, hackberry, mulberry, thorn, willow, alder, holly, birch, beech, cucumber, peawood, wild cherry, sourwood, the serviss tree, all growing in friendly companionship on a single mountain side. But the tulip tree or yellow poplar is king of the Smokies.

I have found them

growing tall and
straight, eighty
feet to the
first limb,
twenty-
five



"THE CHIMNEYS" ARE A CHALLENGE TO THE MOUNTAIN CLIMBER, AND FEW HAVE STOOD ON THE TOPS OF THESE HIGH PEAKS

IT HAS BEEN SAID THAT ON A FIVE-MILE WALK UP ROARING FORK ONE MAY FIND MORE FERNS, TREES AND WILD FLOWERS THAN ON ANY WALK OF THE SAME LENGTH IN THIS COUNTRY, IF NOT IN THE WORLD

feet in circumference. I have also found hemlocks and chestnuts and wild cherry as great in girth, though not in height. It has been said that on a five-mile walk up Roaring Fork from Gatlinburg, one may find more different varieties of trees, ferns, shrubs and wild flowers than on any walk of the same length in the United States, if not in the world. I listed fifty trees and shrubs and stopped. There were many I didn't know. One of special interest pointed out by my guide was gopherwood. "Old-timers say that's what Noah built the ark out of," he explained, "and I can't dispute it none." He also told me that the mountain people call hemlock



THIS OLD LADY POSSESSES THE KEEN SENSE OF HUMOR TYPICAL OF THE MOUNTAIN PEOPLE. HER DAUGHTER WAS BITTEN BY A RATTLER.—"BUT WE CURED IT WITH RATTLESNAKE'S MASTER, WHICH SOME SAY IS A PIZEN WEED, BUT IT SHORE DID THE WORK!"

"spruce pine," the black spruce "he-balsam," the Fraser balsam "she-balsam," the sumac "shumake," the butternut "white walnut," while cucumber is humorously called "cowcumber."

There are vines everywhere. Vetches, woodbine, crossvine, bamboo vine, trumpet vine, virgin bower, bitter-sweet, wild grape and muscadine are a few I have seen up Roaring Fork. The lovely passion flower, state flower of Tennessee, grows everywhere.

The wild flowers are too numerous to chronicle. Galax leaves are found in profusion. More rare are the fragrant heart leaf, the shortia, the umbrella leaf, Dutchman's pipe, St. John's wort, fringed orchids, both yellow and purple, and the closed gentian. Two of my favorite shrubs are the stuartia, whose large, white, waxy blossoms are found in the spring and the euonymous or burning bush, member of the staff tree family, which delights me in the fall when whole hillsides flame forth with its orange-colored fruit.

There are 137 species of native trees and 174 species of shrubs in this region, according to Ashe and Ayres, in a United States Geological survey report, and according to the last census of the state forester there are 152 varieties of trees found in Tennessee.

The birds of the Great Smokies offer another fascinating study. Bird lovers have listed 264 species, including visitants. I have seen bluebirds, the indigo bunting, wood thrush, cardinal, summer tanager or red-bird, numerous warblers, the Carolina wren, the yellow-breasted chat, near my mountain cottage; and on top of Smoky, the Carolina chickadee, Carolina junco, ruby-crowned kinglet, not to mention wild turkey and ruffed grouse.

Of the game of the Smokies, my guides have told me that the foxes, wildcats and catamounts have about made way with the smaller game, pheasants, squirrels and boomer—a small red squirrel.

"There are a lot of foxes, both red and gray," my guide continued. "Red's the one they chases, but it's



ON TOP OF MT. LE CONTE, SECOND HIGHEST PEAK EAST OF THE ROCKIES, THERE IS A BALSAK CABIN WITH AN OUTDOOR KITCHEN AND MANY OTHER CAMP CONVENIENCES

again the law to kill 'em. There's a lot of bear. Some folks think we've got two kinds of bear, brown and black, but there's only one kind, the black bear. Hit

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The Increment Borer

By DANA PARKINSON

FORESTERS are now able to read the life story of a tree by a very simple device which draws out the record secretly hidden under the bark. This device is known as an increment borer, a hollow auger about three-eights of an inch in diameter. By inserting a thin dagger-like rake into the borer, the cylindrical boring of wood is withdrawn from the tree intact.

Most people know that trees add or grow a layer of wood on the outside of the old stem or trunk each year. The bark, of course, is pushed out to make room for this new layer. These annual layers form annual rings. A ten-year-old trunk of a tree would resemble ten nested stovepipes or ten hollow cylinders.

The borings are made horizontally and toward the heart of the tree, that is, toward the center of the cylinders. When this cylindrical bore of wood is removed, the line where growth ceased for each year is indicated by denser wood. Distance between lines of dense wood indicate rate of growth. The history of the tree is thus recorded. Narrow ridges mean retarded growth. Wide annual rings indicate that the tree is producing wood rapidly. Growth is retarded whenever a wind storm breaks off a branch or when fire has damaged the base of the tree. A dry season or the crowd-

ing of other trees will also retard the growth of a tree. Growth is increased whenever a neighboring tree dies and makes more light available or when a wet year occurs.

The tree thus records its own experiences, writes its own biography.

The increment borer is in general use among foresters. It reveals many secrets about

the life of a tree or even a whole forest. By selecting average or sample trees, a forester is able to ascertain the age of the stand, the years of good seed germination, the year of high wind and the year old trees died and let the surrounding trees have more sun to stimulate growth.

On all National Forests, every tree to be cut is marked. The ranger who does this work must study each tree to learn whether it is too old to last until another cutting; whether it is crowding other trees; whether it has defects that will bring about decay; whether it can be spared without injury to recreational values. Trees to be left are also studied as they are expected to reproduce as well as increase their own rate of growth after removal of the surrounding trees. The increment borer is invaluable in these studies.

Possibly the principal purpose of the study of tree growth is to ascertain the rapidity of wood production under various spacings of trees.



REVEALING THE LIFE STORY OF A TREE. THE INCREMENT BORER HAS MADE IT POSSIBLE FOR FORESTERS TO LEARN MANY SECRETS ABOUT THE GROWTH OF A TREE OR EVEN A WHOLE FOREST



"For Three Days The Unmatched Pair Closely Kept Their Unusual Companionship"

The Eagle and the Raven

A Wierd Incident of the Wilderness --- What Inspired this Strange Companionship?

By WILLIAM N. CRAIGIE

Illustrated by Charles Livingston Bull

STANGE how some incidents, not particularly striking or dramatic, linger in a man's memory. There is that of the eagle and the raven, for instance.

Two summers ago I was traversing the territory of the boundary line of Alaska and Canada, somewhere near the sources of the Porcupine and Peel Rivers. I was in search of that old will-o'-th'-wisp of the prospector—a lost mine of fabled richness. Needless to say my quest was fruitless. However:

I was "flying light." I had been in that part of the country before and knew it would be no great hardship to live off my gun while there. All I had was rifle, ax, shells, and small pack, in all forty pounds, perhaps; enough for the average man to pack around over a region as rough and hilly as the one I traveled.

The sun still held high though I had been trudging for twelve weary hours that scorching day. I was ravenous—game had been extremely shy—and utterly fagged, but kept on for I was cheered by the sight of jagged outlines of hoary, dead mountain-spruce at the head of a gulch about a mile beyond and beneath me, and, glory be! the blessed flashing of water. Yet I nursed a grouch. An eagle, a genuine old baldheaded eagle, had rendered slim my chance of having fat mutton chops for supper that night. Just as I had a bead on a fine ram standing guard on a pinnacle, the royal bird swooped on a little lamb beside its mother, scattering the flock before I could pull trigger. I was almost famished, with only tea in my pack to assuage my craving. That which might be my next meal still roamed the peaks, so I was hardly to be blamed for being in a savage mood toward eagles. It can readily be seen that though it was evening it was not nearing the end of a perfect day for me.

As I approached the nearest tree that had given up its struggle for life, its twisted, gnarled, whitened skeleton proving the valiant fight it had made against tempestuous buffettings, I saw an eagle perched on one of the upper branches. In answer to my grouch, thinking it the one that had balked me in my "kill," I shot at him but apparently missed; he flew on down the valley out of sight. Many will take exception to my act, but when a man's belt is buckled in the last hole there's not much room in him for patriotic sentiment.

Reaching the water, I drank, made tea, then went on a hunt for supper. Luck was with me this time; I ate mutton chops, though considerably later than I should have done had I not been foiled by the eagle.

As the ram I got was particularly fine, and as I did not wish to be hampered by the extra weight of green meat on my journey, I decided to stay where I was and partly dry it. Cutting it in flakes I hung it on a rack above my fire and then lay down for a few hours' sleep.

Awaking I looked around and saw an eagle on one of the trees about two hundred yards off. I also saw a smaller bird peacefully sitting quite close to it.

Wondering, though not particularly interested, at seeing his imperial majesty quietly perched by the side of a bird of other than regal strain—usually that status calls for at least armed neutrality—I looked through my glasses and saw the other bird was a raven. Then I observed something else; I saw one of the legs of the eagle hanging down as if partly severed, so concluded it was the one I had shot at.

Not wishing to have the thing suffer I picked up my gun to put it out of its misery; trying to get close to insure a dead shot (shells were precious then), but before I had gone a dozen steps, the raven loudly croaked and flew off, the eagle clumsily following until they reached another tree about half a mile away, where, again, they took position near each other, the raven alighting first. I made no further effort in my merciful intention.

For the three days I was there the unmatched pair closely kept their unusual companionship. Once I saw them on the ground, side by side. Often they came to the tree where Baldy had been shot. It struck me that he had his aerie somewhere near and that his queen was sitting, but though I looked I could see none.

What was the reason for the strange, apparent friendship? I can only conjecture. Was the raven's motive altruistic? Did he take pity on the crippled monarch and was he helping him to obtain food? I did not see them eat, though they may have eaten the offal of the ram I killed. Or was the evil bird of somber hue ominously waiting for death that he might dine on royal flesh? Frequently I have seen ravens hovering

over caribou, injured during migration. I also recall a hard experience I had some years ago on the Arctic slope. I was lost; starving, with nothing to eat and no means of getting anything to keep life in me, yet the thing that haunted me most was the incessant swishing of the wings of three black ghouls directly above my head as I staggered along, not knowing where. Even though my brain was dulled, ever the thought was in

me that they were waiting for me to die. But accident cheated the trio of sinister purpose; I stumbled onto an Eskimo village after jabbering to myself for about a week.

Still I can not help thinking that corvus was there as friend to aguila; they sat together so friendlily, with "Nevermore" seemingly showing an air of solicitude that fitted well his sable coat.

State Forests vs. National Forests

Maryland's Answer

By F. W. BESLEY, *State Forester*

THE leading editorial in the July number of AMERICAN FORESTS AND FOREST LIFE, under the caption of, "Maryland's Strange Reasoning," calls upon the State to defend the position taken by the last Maryland Legislature in repealing the Enabling Act permitting the Federal Government to acquire National Forest lands in Maryland.

The Enabling Act was passed in 1908, less than two years after a state forestry department had been organized and before an established policy had been developed. At that time there seemed little possibility of securing money for the purchase of State Forests, and therefore a State Forest program was not contemplated. The situation has changed very greatly in twenty years. The State has been gradually building up a strong forest policy which is now established and complete. It believes that the acquisition of all forest lands which economically demand public ownership should be assumed by the State and their management should be coordinated with other activities for the benefit of the people of Maryland. The State, itself, is fully able to assume that responsibility.

State Forests furnish the background to support and correlate the other forest activities. They give stability to a forestry department. There is pride of possession on the part of her citizens. Their interest in forestry is stimulated because their state owns forest lands.

As long as the Federal Government had the right to establish National Forests in Maryland, even though it did not exercise the right, there existed in the public mind a feeling of divided responsibility and the obligation of the State could not be definitely fixed.

Maryland has come to realize that the act of 1908 permitting the Federal Government to take over exclusive control of even a part of its lands, depriving its citizens, for all time to come, of the right to tax and regulate, was a matter of serious concern. She wanted to avoid this possible interference from the Federal Govern-

ment. The area of forest land requiring public ownership is not large. Should the Federal Government, at some time, in its policy of acquiring National Forests in as many of the states as possible, in strengthening the national program, seek to secure lands in Maryland the State and the Federal Government would, in a limited area, be competing for the same lands and a conflict of interest would inevitably result. The State's program of extending the State Forests would be severely hampered if not entirely defeated. There would be divided responsibility in forest protection and other forms of state-wide activity. A dual sovereignty would be set up which is absolutely contrary to Maryland's stand on State's rights.

The State, under the able and progressive leadership of Governor Ritchie, is to an ever increasing extent realizing its obligations and serving the needs of her people. He has taken a strong stand against federal interference with the internal affairs of the State, and the fact that he has been reelected for a third term—the only man who has served more than one term as governor in the history of Maryland—shows that the people of the State are fully in accord with his policy.

The stand taken by Maryland places her in the same position as many other eastern states which do not want National Forests within their borders. Notable among these are Massachusetts, Connecticut, New York, New Jersey, and until recent years, Pennsylvania—the very states that are leaders in the forestry movement today. Pennsylvania, which stands out pre-eminently in the acquisition of State Forests and forest achievements, gave its consent reluctantly and with an understanding as to the location and extent of National Forest purchases. It is significant that since the Federal Government has acquired the right to purchase in Pennsylvania the additions to her State Forests have been almost negligible. This is the apparent result in other states where National Forests are purchased. Maryland is not unmindful of the signs of the times.



Andy Holds the Fire Line

The Story of a Red-Blooded Boy Who Got His Chance

By ERLE KAUFFMAN

Illustrated by Eugene Cassady

ANDY was resting easily upon a flat rock, viewing with satisfaction the string of fish dangling heavily from the line in his hand when the ranger rode up. He was too busy dipping the fish into the creek, just to watch their sleek, steel-colored bodies glitter up at him through the blue water to note the serious features and determined bearing of the ranger. His mind was retracing the steps he had taken that day; reviewing the exciting battles some of the larger trout had given him. It had been real sport; never again would he be content to fish the tame waters of Happy Creek down in the valley where round-bellied little perch gasped and surrendered without a struggle.

He looked up in time to see the ranger dismount and amble over to where his father was preparing supper. He liked the ranger, admired his easy manner and broad shoulders; liked to hear him tell of policing the forests, of his encounters with bear and cougar; liked him because his father and all the other men liked him. He thrilled at the mystery that seemed to veil the activities of the ranger. Here today, tomorrow he was riding the distant ranges, poking into untrodden nooks, fighting fires that seemed

eternally springing up back in the wilderness regions. When he was of age, Andy intended to be a ranger; vowed to wrap himself in the cause of the big forests.

His father and the ranger were talking in low voices, and it struck Andy that the ranger's manner was singularly severe. He did not understand the meaning of this, but sensed that something out of the ordinary was about to happen.

He hovered close by, listening for a word that would help him understand. Finally it came, and it left him trembling with excitement. There was a big forest fire somewhere, and he knew that already the trails were crowded with sweating, determined men he had often watched go into the mountains on such occasions. His lithe, young muscles were taut as he watched his father for an indication of what he was to do.

In a moment the ranger looked at him through sober eyes.

"What about the boy, Sam?" he asked his father.

His father gave him a single glance before replying, "We'll take him along; he's quite a lad now."

Andy's heart beat furiously. He moved quickly to his father's side and faced the ranger. "Sure thing, boss," he said, unhesitatingly. "I can do a man's work."



ANDY FOUGHT FURIOUSLY THROUGH THE DENSE SMOKE, WHILE THE HEAT LASHED AT HIS FACE, STRUGGLING WITH THE TWO FULL WATER-BAGS

Andy was tired when they reached the fire camp. Already the smoke was thick and choking. Every now and then he imagined that he could hear the crackling of great pine boughs. He even imagined that he could see the great red flames shooting skyward.

It was quite late and dark by now, but the men, some of them looking soberly at Andy, were called together by the ranger and given instructions. Quickly they equipped themselves with axes and shovels and disappeared into the smoke-filled woods in small groups, until only Andy, his father, the boss and the camp crew were left. Andy kept very close to his father, determined that he should not be forgotten when the call came. They were standing silently by the kitchen tent when the ranger came up.

"I hate to do it, Sam," he said, "but the wind is rising and sparks are flying everywhere, so I expect you will have to hit off across the river and watch out for small fires. Mighty dry over there."

"You bet, Bill," his father replied, promptly, "it looks bad."

When the ranger disappeared in the darkness, Andy looked anxiously at his father.

"Well, Pop, when do we start?"

His father was watching the timbered wall of the canyon across the river. "Reckon you better not tonight, son," he said finally; "you're too tired. Either the boss or I will come back for you tomorrow. You better bunk with the men here tonight."

Andy's face dropped as he fell back a pace. Was his father forgetting his promise? Suddenly he remembered that if he was to be a fire-fighter he must take orders without complaining. Besides, he *was* tired.

"All right, Pop," he said, cheerfully enough.

He turned to leave, but stopped at a few paces. "Say, Pop, I left my string of fish back at camp. Do you reckon they'll be all right?"

His father smiled through the darkness. "I reckon, son. Good-night."

But he did not see his father the following morning. Instead, he was confronted by the smoke-stained face of the ranger.

"Where's pop?" Andy wanted to know.

The ranger did not look at him. "Across the river, lad, scouting small fires. Want something?"

"Pop was coming back for me this morning," Andy asserted. "Do you reckon he will?"

The ranger shook his head. "Sorry, lad, but you better stay around camp and help Jake in the kitchen. It's one bad fire out there."

Andy looked at him wonderingly.

"But pop said that either you or him would come for me this morning," he insisted. "Gosh, boss, you'd think I was a kid instead of a fire-fighter. Besides, I got—"

"Run along, son," the ranger interrupted, and turned away, leaving Andy shaken with disappointment. After a few steps the ranger turned. "I'm giving you orders

now, son, and I want you to follow them. If you're bound to be a fire-fighter you must take orders the same as the other men, see."

The boy's face suddenly became alive with excitement, and the ranger continued: "What I say goes around here. Now get that black mule in the corral and haul water for Jake. Get the bags at the kitchen tent. Hop, son."

Although disappointed, Andy was spurred to action by the firm command. He was pleased to be classed as one of the men and for the moment forgot the fact that he was to carry water. It made little difference to him at the time.

It was late in the afternoon before it dawned upon him that perhaps the ranger had given him orders and treated him as one of the men just to make him remain in camp. Immediately the task of carrying water became heavy and he went about it unwillingly. As the small mule lazily made its way up the steep trail leading out of the river bed, Andy turned sharply and contemplated his outfit.

"You're a runt," he flung at the mule; "you ain't man-size or else you would be doing something more than carrying water."

He sat down suddenly and dug his heel in the trail, surveying the steep ascent from the river. He mentally calculated the number of trips he had made since early morning, wondering idly if Jake needed all this water.

"You know, runt mule," he said, almost wistfully, "you know what I wish? I wish that I had a chance to show the boss that I can fight fires the same as pop and the other men. I'm darn near a man now and about the best Boy Scout in the country. I know how to fight fires and I got muscle to do it with. I'm not a runt like you, mule."

He dug some dirt from the trail with his toe and started a rock down the hill, watching it in silence until it disappeared in the swift water below.

"Another thing," he told the mule, "they been telling me all about fire-fighting and what to do in case of fire, and all that, but when I have a chance to do something they make me carry water. I'm not exactly complaining, mule, but what's the use of telling me all this if I can't fight fire when I get a chance?"

He got to his feet with difficulty. His legs and back ached with the task of filling the water bags and leading the mule back to the camp. As he stood regarding the river below, his mind went back to his string of fish, and thence to his father, who he knew was somewhere across the river scouting small fires. Why couldn't he scout small fires? Certainly he could fight a small fire.

His meditations were interrupted by a giant spark that suddenly dropped out of the sky and settled in the dry pine needles besides the trail. He watched it with deadly fascination; watched and hoped as it quickly blazed up; a tiny blaze to begin with, but

spreading when encouraged by a stiff breeze. He raised his eyes to the sky and watched. Over his head many such sparks were soaring, driven in the face of a strong wind that came up with the dying day.

His heart began to beat furiously. This was a fire—a forest fire—and there was no one about to fight it but himself. His excitement grew and his face flushed. Here was his chance to show the boss that he was no little runt and that he could fight fire the same as other men. He turned to the mule.

"Reckon we got a big job ahead of us, runt mule." Then assuming the dictatorial tone of the ranger, he ordered the mule into action. "What I says goes around here. Bring them water bags up here, and hurry."

His physical fatigue faded before the new excitement. With much deliberation he sprinkled the blaze with water from one of the bags. He surveyed the finished job with satisfaction and turned to contemplate other conquests. His gaze met with a flame of fair dimensions immediately across the river. Further observation revealed a number of small fires, which threatened to unite into a large blaze before many minutes.

Andy did not hesitate. He turned the runt mule around and began the steep descent to the river. He plunged into the swift water without faltering, keeping an appraising eye on the fire. At mid-stream the mule became disorderly and threatened to break away, revolting at the uncertain footing, but finally responded to Andy's severe treatment and scrambled to the opposite side of the river.

Safely across, Andy contemplated his job, playing with the idea that in the face of the strong wind the fire would mount the crest of the canyon, where, if unchecked, it would sweep over the short plateau and on beyond the point where the skyline faded. To his right the flames were gaining momentum in their race up the canyon wall; to his left the blaze was struggling to survive a short stretch of rock and scant forage. His one hope was straight ahead, where a small ravine had so far prevented the fires from joining. He realized that he must get in the path of the fire to do good work, as the river would check it from this side. Then, too, he knew his father was out there somewhere in the path of the fire and that he would need Andy's help.

Leaving the perturbed mule tied to a tree near the river, Andy approached the fire in a business-like manner, struggling with two full water bags. He fought furiously through the dense smoke, while the heat lashed at his face. With an effort that tore at his tired body, he pulled himself onward until the snap of the flames became fainter, and he knew that he was beyond the fire line. He paused and looked around him, won-

dering what he must do. Ahead in the path of the flames, his eyes rested on a stretch that was scantily covered with forage. It gave him an idea, with which he played for a moment. He decided to take a chance and backfire in this stretch.

As fast as his tired legs could carry him he set about his work, wondering, in the meantime, about his father. He could not suppress a terrifying thought that his father was in danger. With an effort that taxed his courage, Andy fashioned a torch from an old windfall and began to light his fires. Then began the endless task of beating the unruly flames into submission with one of his water bags. In a short time a path ten feet wide had been cleared of everything that would burn. Behind his backfire, leaping with alarming strides, the main fire approached menacingly; but still Andy worked on, his hands and face blistered and his lungs calling frantically for fresh air. Once he contemplated returning to the river and resting, but the flames had joined and closed in about him. There was no escape; his only hope was in checking the fire, which now licked at the edge of the space he had cleared with his backfire.

A big lump swelled in Andy's throat as a giant flame shot through the air above him, jumping the expanse he had so laboriously cleared. It seemed to remain suspended in midair for a moment and then fall back to the opposite side of the backfire. Another flame came shrieking through the treetops above him, and still another, until the whole world about him seemed scorched and blistered by the intense heat. He turned to flee, but found he did not have strength enough left to move his legs. He felt himself falling, stumbling toward the furnace blast of the fire, when a strong arm encircled his weary shoulders and lifted him bodily from the ground. He turned his head in wonderment and looked up into the anxious eyes of his father.

"Gee, Pop," he said, through parched lips, "ain't it hot?"

An hour later Andy and his father rested on the edge of a jagged rock near the rim of the plateau. Below them, less than a hundred yards, the once raging flames were burning themselves out, after a vain attempt to conquer the fifteen-foot stretch that Andy had backfired. Sparks no longer soared above them, and Andy's father explained that it was because the ranger and his crew had the great fire back beyond the camp under control.

"Now we can go back and get my fish," Andy told his father.

His father looked down at him fondly. "Never mind those little fellows, son," he replied, "I know where there are big fish for real men."



Torrent and Erosion Control in Japan

"To rule the river is to rule the mountain."

(Ancient Japanese proverb)

By W. C. LOWDERMILK

Department of Forestry of the University of Nanking

JAPAN proper would be washed into the sea, or the process of erosion would be so far advanced that agriculture could scarcely be followed, were it not for the rich cover of vegetation which mantles the mountains and slopes. The rock structure of the mainland and islands favors rapid degradation; it comprises chiefly coarse grained granites which readily weather and crumble, and lavas and volcanic ash which are subject to rapid erosion. The land is strikingly mountainous and picturesque with steep slopes and narrow valleys. The declivity of the short rivers produces rapid velocities in the waters, which rush back to the sea. Rainfall is heavy and occurs in terrific downpours, equalling as much as 300 mm in twelve hours. The mantle of vegetation, dense and rich in variety of both shrub and tree, restrains the impetuous waters and robs them of much of their prey of silt, sand, and boulders.

Man has here and there in Japan destroyed the cover of vegetation on the sloping lands, and has thus unleashed forces of erosion. Serious examples have demonstrated to the Japanese the dangers of denuded slopes. Previous to 1911, the headwaters of Kirizumi river, which lands are in private ownership, were subject to unregulated cutting of a forest cover of deciduous hardwoods to supply a thriving charcoal industry. Cutting became general, and utilization close, until 1911 when an unusually heavy typhoon occurred. Rain fell in great downpours. The mantle of vegetation was ruptured; the run-off waters filed their way into the underlying loose volcanic ash. The widening of the cuts and gullies increased the accumulation of run-off waters, and produced acceleration of transporting power. Mud flows of the volcanic ash formed and flowed down the valley on to the plain and began to cover the fertile

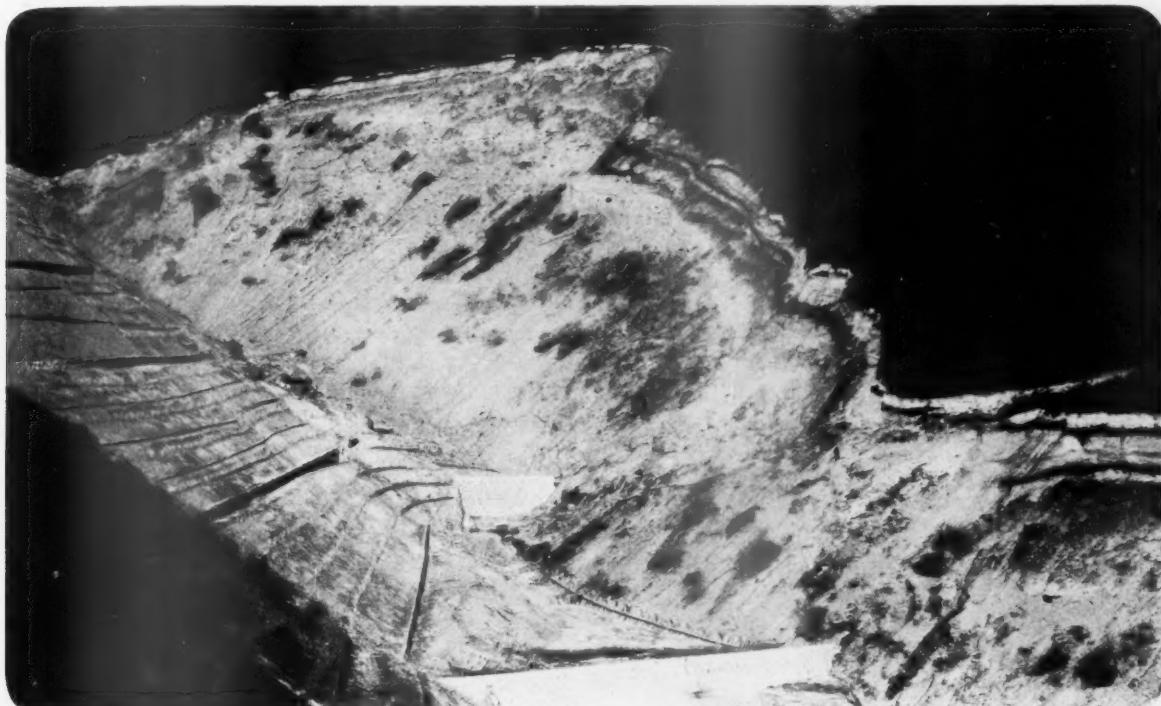


FLOOD AND SERIOUS EROSION FOLLOWED EXCESSIVE CUTTING HERE AT THE HEADWATERS OF KIRIZUMI RIVER, AT HONSHU, JAPAN. BY ENGINEERING WORKS AND THE RESTORATION OF THE FOREST COVER, THE JAPANESE HAVE SUCCEEDED IN ARRESTING THE TORRENTIAL WATERS AND CHECKING EROSION HERE, WITH THE EXCEPTION OF THE TWO HEAD VALLEYS SEEN IN THE PICTURE

terraced and productive rice fields. Floods caused damages in the valley to dwellings and houses of the villages, to roads and to bridges. The mud flows covered up and made of no use valuable rice fields. The loss was a serious one.

Each succeeding year the mud flows continued and

prostrate alder and grass were called into assistance they had reclothed eroding slopes with a preliminary vegetation. They had, in short, gradually diminished the progress of erosion and had replaced it with the processes of plant growth which was healing the gaping wounds in the landscape.



WHERE THE CHESS GAME OF EROSION CONTROL IN JAPAN HAS REACHED INTERESTING DEVELOPMENTS. A CLOSE-UP OF ONE OF THE TWO HEAD VALLEYS, SHOWING DETAILS OF THE SYSTEM OF CHECK DAMS WHICH HAVE ESTABLISHED A BASE LEVEL OF EROSION

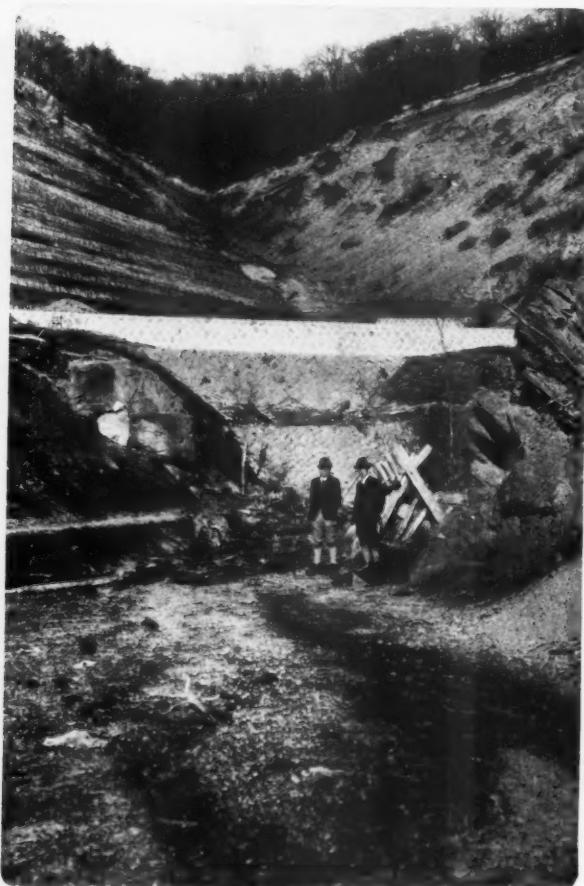
increased in volume. After five years it became imperative to do something to check this growing and dangerous menace. The forest act of 1897 was put into effect, whereby the condition of the forest land was declared dangerous; the area was accordingly declared a protection forest. Cutting was stopped and made subject to the approval of the Forestry Department. The forest engineers were directed to check and control the erosion which had already gained much headway. In 1926, after 10 years of work, the headwaters of Kirizumi river had been reclothed with the exception of two upper valleys.

To look upon an achievement of this sort, where a decade ago great surfaces of loose soil were actively eroding, and eating backward up the high slopes, and where the rage of wild waters knew no bounds, filled me with admiration for the faith, skill, technique and strategy of the forest engineers. With a dam here and a dam there, they had step by step robbed the torrential water of its transporting force; with buttress walls strategically placed they had prevented undercutting of slopes; with works of soil fixation on slopes where

It was a costly struggle, requiring over 120,000 Yen—an expense well justified because it was a case of saving the vanishing rice fields from the blight of mud flows.

A second example lies within Shiga prefecture at the south end of lake Biwar, near Kyoto. About 400 years ago the great accumulation of Buddhist temples of Mt. Hiari were burned by a Shogun who was unfriendly to Buddhism. On the accession of another Shogun all the temples were completely rebuilt. The timber was cut from the pine forests on the slopes of Shiga prefecture. Wars followed which permitted fires to burn unrestricted over the granite hills. From three hundred and forty to fifty years ago the region was practically barren of forests; so much so that the villagers were scarcely able to secure their needed supplies of fuel.

In the 16th year of the restored Meiji, 1871, works of torrent correction were begun in this region under the direction of a Dutch Engineer, Johann Dorehk. First of all, check dams were located strategically in the torrential valleys to rob the impetuous waters of their powers of transportation. Then followed works of fix-



THIS CHECK DAM WAS INCREASED IN HEIGHT TWICE—THE FIRST DAM BEING CONSTRUCTED IN 1918 AND THE SECOND AND THIRD IN 1923 AND 1926. THE GRADE OF THE TORRENT IS REDUCED ALMOST LEVEL AND THIS LESSENS GREATLY THE CARRYING POWERS OF THE WATER

ing the soil on the slopes. The experimentation in the use of various devices and plants was done by the Japanese foresters. Methods were developed which became successful under the skilled application and adaptation of experts. And now one may walk up valleys, past check dams overgrown with vines and bracken over which torrential waters no longer charge, then into the carpet of a thick and absorbent layer of forest litter, through an undergrowth of bracken and moisture and shade loving shrubs, under the full canopy of a pine forest. Now *Chamaecyparis*, a shade demanding species, is being planted under the pine

forest to complete a forest cover.

The policy of erosion control in Japan is based largely upon saving valuable food producing lands from destruction, rather than upon profit from restored lands. During the year 1925 the Tokyo Forestry Board spent 170,000 Yen on an area of 150 hectares or 375 acres for erosion control. The average cost, including the construction of check dams, was 453 Yen (\$225 Gold) an acre. The value of forest land averages about forty Yen. More than ten times the marketable value of the land was spent per unit area for the purpose of erosion control, but the rice lands protected are valued at from 240 to 300 Yen per acre. The preservation of food producing lands in Japan is sufficient reason for heavy expenditures in restoring a mantle of vegetation on eroding lands.

This is not the sole benefit from works of torrent correction and erosion control. The experience of Japan is, that a barren or eroding catchment basin of the short rivers yields more sudden and disastrous stages of high water than similar watersheds covered with forest vegetation. The comparative influence of a forested and excessively eroding watershed is not a debatable question in Japan. The Japanese engineers and foresters, unlike those of some western countries, are in agreement on this point. It is not a question of the influence of forests on stream flow; it is rather how shall barren and eroding lands be restored to a cover of forest vegetation. The disastrous experiences in the narrow valleys from angry flood waters issuing from eroding catchment areas have been costly instructors. The maintenance of watersheds in a cover of forest vegetation has proved to be the most economical policy in the control of flood waters, and necessary to permanency of food production in the valleys.

Dikes are built in the alluvial plains to protect ad-



HERE ARE SHOWN SOIL FIXATION METHODS IN ONE OF THE HEAD VALLEYS OF THE KIRIZUMI WHERE BREAKS OCCUR IN COVER VEGETATION ON SLOPES. NOTE THAT A PLANTATION OF CONIFERS HAS BEEN ESTABLISHED IN A NATURAL HARDWOOD COVER ABOVE THE EROSION CONTROL WORKS

joining fields from inundation and submergence with sands. They are considered essential, even as the mantle of vegetation is considered necessary. These are supplementary measures; nor will one measure alone suffice. Japanese engineers and foresters have progressed beyond a controversial stage to one of cooperation in the control of the natural resources of vegetation, soil and water. Japan furnishes a preeminent example worthy of emulation by western nations in this respect.

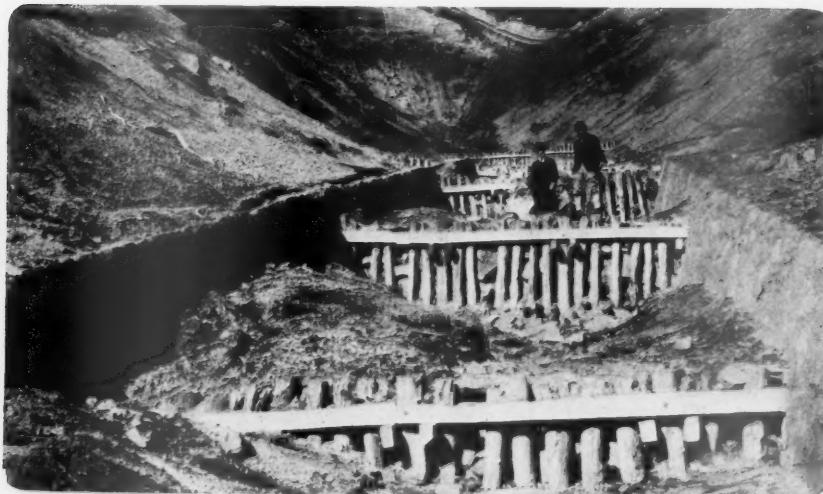
The tempering of the destructiveness of flood waters has its counterpart in the regulation of flow for hydraulic power. The rapid gradient of the numerous rivers issuing from mountains richly supplied with rain assures great potential hydraulic power. This is a very important source of electrical power, which has been used for lighting more widely over Japan than in other countries. Every village and hamlet and most of the farmers' houses are lighted with electricity. Industrial uses of electric power are growing. More than one third of the possible 8,000,000 hydraulic horsepower power is now in use; the development of water power is growing. The permanency and full utility of the resources of hydraulic power is dependent upon a close mantle of vegetation on the sloping lands.

These and other objects were the basis of Article 14 of the Forestry Act of Japan (1897), which provides for the setting aside of protection forests where these objectives may be in danger. The purpose is singly or inclusively as follows:

- (1) To prevent the denudation of soil.
- (2) To prevent sand shifting.
- (3) To provide for protection against the devastation of floods, wind and tide.
- (4) To prevent avalanches and rolling stones.
- (5) To insure a constant source of water supply.
- (6) To afford shelters for fish.
- (7) To afford landmarks for navigation.
- (8) To improve public health and sanitation.
- (9) To maintain the scenic beauty of temples, shrines, noted places and historic sites.



NOW IT IS NATURE'S MOVE IN THE GREAT CHESS GAME OF EROSION CONTROL. HERE, IN THE SECOND ERODING HEAD VALLEY THE SLOPES ARE TOO STEEP TO FIX, AND SO THEY MUST GRADE DOWN TO ESTABLISH A BASE LEVEL, WHICH MAY TAKE YEARS



THIS SHOWS DETAIL OF CONSTRUCTION OF EROSION WORKS IN STOPPING THE DOWNWARD CUTTING OF TORRENTIAL CURRENTS. BOTH SIDE WALLS AND CHECK DAMS ARE USED TO HELP ESTABLISH A BASE LEVEL

Objects numbered (1) and (5), which have to do with erosion control and regulation of water supply, assume the first importance in the area devoted to them. The number and areas of the existing protection forests in Japan follow:

Kind of Protection Forest	Number	Area in Acres
1 Protection against soil denudation	190,840	2,010,857
2 Protection against sand shifting	10,428	27,465
3 Protection against flood	15,624	6,887
4 Protection against wind	13,650	76,087
5 Protection against tides	12,093	20,990
6 Protection against avalanches	4,293	16,850
7 Protection against rolling stones	418	1,243
8 Conservation of water supply	73,628	2,187,773
9 Fishery	23,368	103,097
10 Guiding of navigators	248	5,475
11 Improving the public health	153	223
12 Scenery	8,808	77,487
Total Hectares.....	353,519	4,534,335
		1,813,734

Of the total area in forests of Japan proper, namely 21,408,965 hectares, the protection forests comprise 1,813,734 or approximately 8.5 per cent. Of these, 92.7 per cent of the protection forest areas are devoted to the mutually interacting objects of erosion and water control. For torrential run-off involves the two, water and erosion.

Thus the regulation of torrents or the restoration of denuding or eroding land has become an important part of the work of the forestry department. Protection forests if intact require only careful management to achieve the object of their establishment. But when the

summed up the policy of that period. Little attention, apparently, was paid to the construction of check dams in the channels of torrents. Following the restoration of the Meiji, about 60 years ago, active and careless cutting took place and produced serious conditions of erosion and torrential development in several areas. The regions of granitic structure suffered most heavily, due to the coarse and easily erodable nature of the rock. Floods became increasingly more disastrous. Systematic works of torrent regulation were begun about 50 years ago.

This time, torrent regulation combined both the meth-



EROSION CONTROL IN THE SHIGA PREFECTURE NEAR KYOTO, JAPAN, WAS BEGUN 35 YEARS AGO AND THIS IS ONE OF THE DAMS BUILT AT THAT TIME. SUCH CONSTRUCTION, TOGETHER WITH SOIL FIXATION AND FORESTATION OF SLOPES, HAS CONVERTED HOT, BARREN ERODING AREAS INTO MOIST, COOL, FOREST-CLAD VALLEYS AND STOPPED THE DEVASTATING PROGRESS OF EROSION

forest mantle is broken in steep topography and processes of erosion become active, definite works of erosion control are required. The foresters in Japan have met unique and difficult conditions with these works and deserve the highest commendation from the foresters of the world for their outstanding successes.

Erosion control and torrent regulation are not entirely of recent development. As the population increased in the later middle ages with enlarged demands on the forests, deforestation brought about an increase in torrential development. It became of sufficient importance to require regulatory measures. From the date 1683 A.D. reforestation was extensively applied and the mountains were maintained generally in a forest cover. "To control the river is to control the mountain"

ods in practice in Europe with the time-honored methods of Japan. The former were carried out first under the plans and supervision of a Dutch engineer, Johann Dorehk. In addition to the systems of check dams the Japanese foresters worked out improved methods in the fixation and revegetation of eroding soil. The underlying objectives are: first, the establishment of a base level of erosion; second, the fixation of the soils on the slopes. The latter objective is obtained either naturally or artificially by means of special works and temporary vegetation consisting of grasses, shrubs, quick growing trees like willows and the hardy pine. After this temporary cover is established more valuable species of trees are introduced to compose the forest cover.

The most common species employed for the tem-

porary cover are: *Pinus densiflora*, *Pinus thunbergii*, *Alnus firma*, var. *Yasha Winkl*, *Alnus firma*, var. *Mulnervis Bgl.*, *Robinia pseudoacacia*, L., *Lespedeza bicolor*, *Turcz* var. *intermedia Max.*, *Alnus japonica S et Z.*, *Salix japonica Thunb.*, and other *Salicaceae*.

Since the enactment of the Forestry Law in 1897 works of torrent regulation are compulsory in every part of the Empire. The works in the forest areas are generally carried out by forest engineers under the Ministry of Agriculture and Forestry. But the more extensive dam construction, and the works along the larger rivers is generally done under the direction of

the Ministry of the Interior. Where needed torrent correction work is required on all private lands. The works are done by the prefectural offices under the supervision of the Ministry of Agriculture and Forestry. The costs are shared, 5/6 by the national and prefectural treasuries and 1/6 by the owner of the land. Within the past 40 years, more than 33 million Yen have been spent on torrent correction dams and works of soil fixation on slopes, by the Ministry of Agriculture and Forestry and by the Ministry of the Interior. The importance of torrent regulation, of erosion control, is signified by its general enforcement over the entire Empire of Japan.



Contributed by Mr. H. T. Webster

NO MAN'S LAND

Seeing America first will be a dismal experience shou'd we ever reach the condition graphically pictured by the popular cartoonist, H. T. Webster, of the New York Evening World, in his contribution to AMERICAN FORESTS AND FOREST LIFE.

As a nation we have been prodigal of many things but of none have we been so heedless as the protection of our natural beauty spots and playgrounds. Especially is this true in the more populous sections of the country, just where they are most needed and where Mr. Webster's pen people are symbols of thousands of rest and recreation seekers.

ON AND OFF



A sentinel of the forests. In Chequamegon Bay, near the picturesque Apostles Islands, Wisconsin, this solitary pine finds sustenance in solid rock.



The little orphan of the Wichita National Forest, Oklahoma. Abandoned by its mother, this fawn is being raised on a bottle.



Engelmann spruce near Leadville, Colorado, showing the influence of prevailing westerly winds.



—W. M. Marsh

When this pepper tree in Los Angeles, California, was a sapling it was tied in a knot, but its bid for life was not discouraged.



One of nature's freaks. Elephant rock near Aspen, Colorado.

—W. G. Weigle

Crowds viewing forestry exhibit in front of the postoffice, Seattle Washington.



THE TRAIL



Who wants a teddy bear? Alaskan bear cubs viewing the world with much incredulity on their first venture from their den near Fairbanks, Alaska.



On the outskirts of Lansing, Michigan, is the scene of a struggle between tree and rock. Both still exist, but each bears the scars of battle.



Peculiar growth of a honey locust tree in western Kansas. The lower branches are entwined in such a manner as not to seriously retard the growth of the tree.

The ultimate result of wind erosion. A ge-old Wiliwili tree in its death struggle on the Hawaiian Islands.



New York State College of Forestry.

Cutting a twelve inch log in forty-four seconds. Annual sawing contest at Syracuse University, New York.

The Hooded Knight, a strange rock formation in the Gila River Valley, New Mexico.





THE FINE OLD TIMBERLINE-TYPE TREE NEAR OUR HOME BECAME INFESTED AND WE DETERMINED TO TRY AND SAVE IT

I OWN a number of acres in attractive land located at Estes Park, Colorado. Part of the land is heavily wooded and my cottage is on the edge of the timber surrounded by a few fine old trees with considerable younger growth. The ground is mainly on a high, dry ridge, and the timber is principally Western Yellow Pine.

During the summer of 1925, the pine beetle was very active in the vicinity. Hundreds of fine trees were destroyed. In places the havoc wrought was confined to certain groups of trees; in other places single trees were attacked.

As is now generally known, the fact that beetles are in a tree can be determined by the presence of approximately half a thimble full of sap, which has run from the hole made by the beetle on entering, and to this sap adheres the sawdust made by the beetle. These accumulations of sap and sawdust are termed pitch-tubes, and I have seen many dead trees with only nine or ten of such pitch-tubes, while others have shown hundreds

How We Saved Our Tree From Insects

By EDWARD J. WALSH

of them. These holes are usually only on the trunk of the tree, generally above the height of a man on the larger trees, but sometimes extending down to the ground level, or even in the exposed roots. The tree will remain in foliage during that year, but if enough beetles have been at work the tree will be dead by the following spring.

Appeals for information to the Forest Service and to the bureaus of the various States have heretofore brought forth only the advice that the affected trees should be cut down and the bark burned. This method of treatment is, of course, heroic, and with the knowledge at hand at present it seems to be the only one that can be resorted to where many trees in a small area are affected.

In the month of June, 1925, we detected the presence of beetles in a tree some twenty feet from our cottage.

It is a tree rather similar in formation to those at timberline, and is approximately ten inches through at the base. Because of its quaint shape and the fulness of its foliage, it is a very decided asset in its location. We had learned that several large trees had the year previous been saved by a certain treatment, and we



A CLOSE-UP OF THE JOB—THE LIGHT SPOTS ARE PUTTY, USED IN CLOSING UP THE BEETLE HOLES SO SUCCESSFULLY

determined to try it. I procured a sixteen-ounce can of carbon bi-sulphide, a surgeon's hypodermic syringe, a



EDITORIAL

The West and Its Wilderness

THE effort to link the revered summit of Mount Hood with the maddening crowds of the bizarre tourist world by means of a steel cableway is significant of a movement that is gaining rapid and headless momentum in the West. It is nothing less than commercialization of recreation in the name of development. Its main objective seems to be to tap the scenic grandeur of the West with a system of motor roads and other speedy means of transportation in order to open the gates of conquest to the motor tourist, hotel and resort owners, gasoline and hot dog vendors. The extent to which this movement is permitted to continue unchecked and undirected will determine whether or not the West in years to come will be able to offer any real wilderness country.

Ten years of frenzied road building and motor development have made astounding changes in the mountain regions of the West. It is doubtful if western people themselves appreciate how rapidly their heritage of back-country is disappearing. Those who visit the West at five or ten-year intervals, however, for mountain travel, study, or exploration are sadly impressed with the changing aspects of regions which only a few years ago were practically in their primitive state. The outward and visible signs of a vanishing country are keenly alive. Many of these regions during the summer are swarming with motor cars and tourists, and the country has lost much of its charm, influence and character as wilderness country. As has often been pointed out, scenic resources are just as exhaustible as any other natural resource, and the rate at which the remaining scenic areas of the West are being invaded and made commonplace merely for the commercial advantage of certain interests is a problem worthy of the best thought of the western people.

Economic development naturally demands recognition, but it is not at all necessary or desirable that in the growth of the West all of its most outstanding scenic country shall be permitted to lose its esthetic, spiritual and historical character. It is reported that in California a motor highway is being projected along the divide of the high Sierras following the present route of the Muir Trail. This seems to us a case of marring

a scenic and historic asset of incomparable and unreplaceable value—a form of so-called development that would approach the tragic.

It is fortunate for the West and for the entire country that the Chief Forester of the Forest Service has taken a firm position against the commercialization of all the scenic gems of the National Forests. In refusing a permit for the construction of the steam cableway to Mount Hood, Coloney Greeley's view was expressed in these words:

"Peaks like Hood, Shasta, and Whitney, preserved and revered as nature made them, represent one of our greatest assets. And I can not but believe that the esthetic, or sentimental value of such outstanding natural features would be impaired through subjecting them to this type of development. In my judgment the material gains in tourist traffic, even the opportunity afforded more people to visit such points, are not sufficient to compensate it. Another reason which underlies my conviction in this matter is the general need of preserving a substantial portion of the more beautiful and scenic areas in the National Forests in as nearly natural conditions as practicable. It is my conviction that this aggressive conquest of the western wilderness may go too far. I believe that it is time to bring positively into our conceptions on this whole question the social need of keeping some of our mountains and forests 'undeveloped'."

Although Colonel Greeley ruled against the Mount Hood cableway, the question is not yet settled. Commercial interests in Oregon, it is reported, are planning to carry the cause to Washington in the hope of overruling the Greeley decision. Mount Hood and the high Sierras are only two of many cases of this character that are bound to arise with increasing frequency during the next ten or twenty years. If local interests which look only to commercial aggrandizement are allowed a free hand, there is little hope of saving to the people of the country some of the wilderness areas of the West.

The West itself would be none the worse for a spark of indignation at this abuse of its greatest natural glories. Is there no public sentiment there to contradict the designs of unsympathetic commercialists?

The First International Soils Congress

THE eyes of Americans were opened to the great problems of soil science in relation to forestry, particularly to the tremendous influence of the biological life in the soil on the growth of the forest, when more than five hundred delegates of the First International Congress of Soil Science met in Washington June 13 to 22. Sixty men interested in forest soils gathered in a special two-day session to discuss this problem alone. Among them were the outstanding forest soil scientists of Europe: Hesselman and Melin, of Sweden; Weis of Denmark, and Krauss and Albert of Germany.

Too often have Americans attributed forest growth to light alone, or to the inherent characteristics of the tree. Too often have they overlooked the soil. A soil may be rich in nutrients of all kinds and yet little growth is made by the forest. Conditions must be favorable for the micro-biological life to make over these nutrients into available forms for plant assimilation. Favorable conditions for the growth of fungi in perfect symbiosis with tree roots are found in many cases to be essential to the best development of the tree. In agriculture much can be accomplished by cultivation and fertilization; the forest must care for itself. It must itself furnish the fertilizer by the addition of leaves and twigs, and the cultivation by the penetration of roots. The great ad-

vantage long known to exist of growing mixed hardwood and coniferous trees is largely explained by the favorable conditions for micro-biological activity brought about by this mixture.

America is now ready to embark on an extensive program of timber growing. It is vital to know what soil conditions are favorable or unfavorable for the growth of trees and why. Two apparently like soils may be entirely different due to different biological relations. Only one of these soils may be suitable for growing trees.

To know in advance these facts and how to apply them may save the country large sums of money and valuable time needed for growing the next timber crop. Europeans have worked out for their few species many of the problems of forest growth in relation to biological activity. America with ten times as many commercially important species has before it a tremendous task.

Much knowledge regarding agricultural soils in the United States has been accumulated by soil surveys and experimentation. Crops best suited for different soils have been determined. The time is now ripe for soil scientists and foresters to extend this study to all potential forest soils.

Mrs. Gerard and the People's Forest

NOW that forestry has passed beyond the experimental stage and the people of the country are evidencing amazing interest in its future, the nation is not without regard for those who early deplored the waste of forest resources and pioneered the fight to prevent it. An incident depicting this fact occurred at the last joint banquet of The American and Connecticut Forestry Associations at New Haven, when Mrs. Frederick W. Gerard, Chairman of Conservation of the Connecticut Federation of Women's Clubs, was introduced. As the silvery-haired little woman rose slowly to her feet, all the hundreds of other people in the great banquet hall, spontaneously and without signal—governors, scientists, foresters, society leaders, business men—all stood in homage to Mrs. Gerard.

It was a mark of honor,—a tribute well deserved. In the days before there were any forestry schools in America, before the National Forests were clearly understood and appreciated, before state or municipal forests were even thought of, Mrs. Gerard had visioned just what forestry meant. The owner of a hill farm in New England, she had seen and deplored waste of forest resources. She was one of the first in her own state to adopt forestry methods in the care of her own lands. She helped draft the first shade-tree laws and assisted in the early development of the Connecticut Forestry Association. Indeed, she led the way for all the notable

conservation accomplishments in that state.

Despite advancing years, she has continued to preach the gospel of "better forests, better people." After her pleas for action, people began to ask, "Just what can we do for forestry in Connecticut?" "Help buy a State Forest," was her answer, and thus began the People's Forest movement, something unique in the history of forestry. From the small subscription of women's clubs, outdoor organizations and groups of all kinds, as well as individuals in every walk of life, has grown a State Forest. The fund administered by the Connecticut Forestry Association is used to purchase land which is deeded to the state. The forest is still growing in area as subscriptions are received, and it will eventually be the finest in the state. Two years ago she saw it dedicated with an historical pageant, attended by 2,500 people. "The Forest," as she calls it, is still incomplete, but she is still working and her work is still bearing fruit.

Mrs. Gerard's message to The American Forestry Association was brief but prophetic. It was her life's creed reduced to a single quotation from an ancient saying, "That which thou earnestly desirest and worketh for shall surely come to pass." Much that she has ardently desired and worked for has already come to pass, and The American Forestry Association wishes her a long life that she may see increasingly the fruits of her years of labor for better forests and better people.

HUNTING EXPERIENCES IN ZACATECAS



By A. D. SPROAT

TYPICAL MULE DEER COUNTRY. THERE ARE FEW TREES OF ANY SIZE, NOPALES AND MEZQUITE FORM THE GROUP AT THE LEFT, WITH NOPALES AND CARDENCHES IN THE CENTER AND THE "PALMA" OR YUCCA AT THE RIGHT

FRESNILLO in the State of Zacatecas, Mexico, is a mining town of about 15,000 inhabitants including probably one hundred foreigners; the foreigners are chiefly Americans and British. It is situated some 750 miles south of El Paso, Texas, at an altitude of 7,300 feet, in a more or less rolling country, wide and fairly level valleys and some hills, with mountain ranges in the distance to the west.

Small lakes and ponds afford good duck and some goose shooting during the fall and winter. There is fair deer hunting and, in places, considerable numbers of wild turkey.

A strip of country, thirty to fifty miles wide from east to west, is agricultural and grazing land, on which no deer or turkeys are found. This north-south strip of land separates the mule deer country from the country where white tail deer and turkeys abound. Near Fresnillo there are no mule deer at all to the west in the mountainous country, and no white tail nor turkeys in the

rolling thorn brush covered country to the east across the strip of grazing and agricultural land.

Within fifteen to twenty miles northeast of Fresnillo the country becomes covered with thorn bushes of many kinds and, within a few miles more, mule deer are found,—though they are more plentiful in country about fifty miles from the town.

There are no trees of any size in this mule deer country, the largest and practically only tree being the mezquite. The country, however, is thickly covered with shrubs largely thorn bushes as Chaparro Prieto, Gatauna, many kinds of Nopales, Ocotillo (*Fouquieria splendens*), Cardenches (*Opuntia imbricata*), numbers of Biznagas (*Echinocactus*); such spineless shrubs as Gobernadora (*Covillea tridentata*), Engordacabra (*Salvia ballotaeflora*), Salvia Real; and scattered "Palmas" (*yucca*).

Here the mule deer grow large, weighing 200 pounds. In November before the rutting season begins they are fat and in fine condition. The deer are very fond of the



A CAMP AMONG THE MEZQUITES IN THE MULE DEER COUNTRY. THE HUNTER HAS BROUGHT IN A GOOD BUCK. NOTE THE CURVED, FORKED TIPS OF THE ANTLERS



OUR CAMP BY A WATERHOLE IN THE MULE DEER COUNTRY—TENT, CAMP-FIRE AND RED TOURING CAR ALL IN PLAIN SIGHT OF THE GAME WE HAD COME TO HUNT

Engorda-cabra and the Salvia real and also eat the tunas (fruit of the nopal or prickly pear), especially of the duraznillo family, and of the Cardenches. When the large clusters of bell-shaped cream colored flowers of the "palmas" begin to bloom, they eat these also. The smaller "palmas" are used by the deer in the early fall to rub the velvet off their antlers.

As one has to move about in this open country, the deer almost always see the hunter first. Practically the only way, therefore, to hunt these deer before the rutting season—and during the rutting season the meat of the bucks is very strong—is to look for fresh tracks and follow them very carefully, now and then making wide detours about cattle, horses or burros. These animals are very wild and if approached within two hundred yards, are apt to run, and frighten the deer.

Naturally it is useless to follow tracks going with the wind unless the breeze is almost imperceptible and then only by making detour after detour in the hope of finally getting beyond the deer and approaching him by walking into the breeze.

In tracking deer after ten o'clock in the morning, one must be very careful, especially on approaching anything in the way of shade, as it is sometimes possible to distinguish the curved forked tips of the antlers among the small branches of some bush or to see them move slightly now and then. The writer has shot two bucks in this way, one of them without being able to see the buck at all and, luckily, the first shot breaking his neck and killing him instantly.

In this thorny country there are many coyotes, some bob-cats, and quite a few mountain lions, all of which probably destroy many young deer. One December the writer shot at two young deer, about a year and a half old, killing one outright and breaking one

shoulder of the other. It was in rather thick brush and the deer were probably fifty yards away. Immediately a coyote jumped out and followed the wounded deer, pulling it down within another forty or fifty yards, its fangs tightly fastened in the throat of the deer. An explosive bullet quickly finished the coyote.

Most wild animals have a very keen sense of sight in that they will see immediately almost the slightest motion at a considerable distance, but, apparently, pay no attention to the most unusual sights if there is no movement. One day, while hunting mule deer in this country, the writer and a Mexican boy saw, at probably two

hundred and fifty yards, a bobcat perched in the top of a short "palma" moving his head round and round like an owl apparently watching for some prey. We decided to see how close we could get, though we were practically in the open, there being only bushes about waist high. Every time the bobcat turned its head in the other direction, we ran without stopping a few steps toward it, stopping perfectly still as it turned in our direction.

In this manner we came within a few feet of it although it looked directly at us with every turn of its head. Finally we got so close that the Mexican boy picked up a stone weighing probably a pound and struck the cat fairly, knocking it to the ground. With that, the mother cat, till now unseen by us and probably asleep, jumped from a



THE MORE RUGGED COUNTRY OF THE BLACK BEAR

lower branch to the ground and we realized that the first cat was not full grown.

In this country in the dry season the water holes are miles apart and, judging from the ground on which tracks are found, the deer must go weeks without drinking water, getting considerable moisture from the juicy tunas or nopales. When there is little grass for the cattle, the ranchers send men out into the nopal thickets to hack off the branches (*pencas*), of the nopales with long knives (*machetes*) like corn knives and singe the thorns (*espinas*) off by holding the branch on a sharp stick over a fire. The deer are not frightened by these men, who do not carry arms, and are frequently seen early in the morning feeding on the singed nopales.

The white tail deer is much smaller here than the mule deer, and is very quick in getting away up or down the rocky mountains where the big rocks are covered by enough tall grass to make the footing dangerous. They are called "Venado Salton," or jumping deer. The mountainous country of the white tail is covered with short leaf yellow pine and some long

leaf, pinon, several kinds of small oak and, in places, much juniper (called "cedro"), madrono, and, on the hillsides, large patches of manzanilla (*manzanita*). The black bear are particularly fond of the juniper and manzanilla berries and the wild turkeys eat quantities of both the flowers and berries of the manzanilla.

Springs are frequent in



A MOUNTAIN MEADOW IN THE COUNTRY FREQUENTED BY WHITE TAIL DEER AND TURKEY. HERE ARE PINE AND JUNIPER

the mountains and, judging from the tracks, the white tail deer usually drink every night or early morning. As the air eddies much in the mountains and, in the winter or hunting season, the leaves and brush are dry, one most frequently startles the deer which may run a short distance, stand and look back; if it keeps going, it must then be looked for very slowly and carefully either by trailing, which is difficult, or by making a circle ahead. Now and then, however, one sees deer standing in the shade, lying down, or feeding, before he is seen, and then he may approach very close if making no movement whatever while the deer is looking.

Last April, just before the deer shed their antlers—the writer while hunting turkeys and, at the moment, having two Mexican guides with him, came upon three bucks feeding on short green grass, having their heads hidden in the tall dry grass. We saw the deer before they saw us and we remained motionless, standing in open country, a mountain meadow, in grass about knee high and only here and there a small tree. One or another of the bucks lifted his head up quickly every few seconds and glanced around and resumed feeding—in our direction, though we were in plain sight and the least movement on our part would have caused them to leave at top speed.

The breeze was at right angles from us to the deer. By the time the two smaller ones had worked straight toward us to within about forty yards, the big fellow had worked up even with us but to one side, and caught our scent. Instantly up went his head and tail and he dashed off past the other two, not stopping until out of sight. The remarkable thing to me was that this made so little effect on the other two. They instantly threw up their heads and tails and watched number one until he was out of sight, at the same time glancing quickly about in all directions, but



A BIG GOBBLER BAGGED IN AN EARLY MORNING HUNT

otherwise remaining motionless. As soon as number one had disappeared, they began slowly and noiselessly stepping off, lifting their feet high, tails up, and making not the slightest sound. After they had taken a dozen steps or so, I said to the Mexican boys "vamonos" and we started. Of course the deer left the country.

On this same trip,—a turkey hunt,—we were sitting around the camp fire the first evening out, in a rather open meadow, when we saw three bucks, all full grown ones, come out of the timber and cross the meadow toward us. We had a fire, a tent up, and our car,—a red sport model touring car,—all in plain sight, yet, as we made no movement, these three bucks passed by us at a distance of about fifty yards, browsing here and there off the bushes, without paying any attention to us, whereas a word, a movement on our part, or a breath of air from our direction, would have sent them flying.

Another time I came suddenly on two does lying down. They were about twenty steps away when one jumped up and dashed off. The other jumped to her feet at the same time, but I was instantly standing motionless though in plain sight. She stood there a few moments and then started carefully trotting off in the direction the first had taken.

Though it has no sense of smell, the wild turkey has the keenest of eyesight and, undoubtedly, many turkeys see the still-hunter while he never sees them. They leave the country without making any sound whatever. The wild turkey, too, will pay no attention to the appearance of the hunter unless or until he makes some movement. Twice have I had wild turkeys feed practically through camp,—unfortunately when I was away and only the cook was in camp to enjoy the spectacle. Camp things were lying about in plain sight, a fire going in each instance, and the cook lying there watching them at only a few yards distance.

I once shot a big gobbler feeding across an open mountain pasture, by running a few steps forward every time he lowered his head to feed, and stopping instantly the moment he started to raise his head. He looked at me as I drew near, but, seeing no movement, went on feeding.

Another time I stood perfectly still and without cover while a gobbler fed right up within gunshot. Yet, if a turkey sees the hunter moving, it is almost hopeless to follow him; he can and will cover much ground quickly and silently.

The gobblers and hens both are fat in April when the calling season begins, but, by the middle of May, when this season is about over, the gobblers are thin. During this time they have been very busy, have eaten little, and have lived largely off their "breast sponge,"—a mass of fat which forms on their breast before

the calling begins, and serves to bridge the emergency.

The eyesight of the good Mexican mountain guide is remarkable. A number of times I have had my guide point out a standing deer to me which I have been unable to distinguish until it moved. One example will suffice:

One morning three of us Americans and two Mexican guides drove in the car from our camp to a gentle slope between two higher parts of the mountain, whence we could see across a wide gently sloping canyon. We stopped the car in a rather open space and, as we were not yet near the point where we expected to hunt, the doors of the car were slammed on getting out. Immediately one of the guides said "There are two deer feeding over there." On his pointing out the exact spot from a certain prominent object, none of us Americans could see the deer until we got out the binoculars. Even after that it was just possible for us to see the deer with the naked eye; and the deer had not seen nor heard us.



BACK IN CAMP AFTER A PROFITABLE DAY—A GOOD BAG OF WILD TURKEY AND WHITE TAIL DEER





NINE MILE LAKE RANGER STATION—A SLANT AT THE CABIN AND THE "JUNGLE" SURROUNDING IT. THE BLACK BEAR CLIMBED THE LARGE FIR AT THE CORNER OF THE CABIN, TORE AWAY THE SHAKES AND MADE HIS UNCEEREMONIOUS ENTRANCE

My Grizzly Caller

An Unforgotten Page from a Forest Ranger's Diary

By W. C. McCormick



Y FIRST assignment in the United States Forest Service was in the capacity of a Forest Guard at Nine Mile Lake, on the Blackfeet National Forest in northern Montana. Here I began my apprenticeship as a Forest Ranger, in the spring of 1910. The cabin I used as headquarters stood on the shore of a beautiful little lake in the heart of a virgin forest. It was an isolated spot, off the main wagon road and trails, for the country had not yet been opened up by good roads.

Black, brown and grizzly bear, mountain lion, deer, moose and other wild animals roamed the woods unmolested. In the evening I could sit in front of my cabin until night closed in upon me and watch does and their fawns feeding at the water's edge, while during the night I was oftentimes awakened by the clatter of tin cans

as bears investigated the contents of my garbage pit.

The great number of forest fires burning during the summer of 1910 drove the bears out of the "back country" and down into the settled sections in search of food. For this reason there were more bear seen that summer than ever before. My cabin, being just in the edge of the unburned border of the forest, received many of these visitors.

Having been reared on the plains of Texas and eastern Montana and never having had much experience with bears prior to this year, I naturally had a wholesome fear of them. Therefore, when I was aroused from my slumbers one night by a loud sniffing and the "rattle" of claws just outside my window, I quite naturally sat up and took notice. Going quietly to my mosquito-netted window I looked out. There, in the moonlight, not four feet from my amazed eyes, stood the largest grizzly bear I had ever imagined. His great, broad silvery head moved backward and forward keeping pace with the "crunch, crunch, crunch" of his powerful jaws

as he devoured the fish bones discarded from my late supper. A strange, chilling sensation traveled along my shoulder blades and the hair on the back of my neck seemed to crawl up to the top of my head. To put it mildly, I was scared.

Moving back a step I silently withdrew a 32-20 Colt's from its holster and approached the window. Slowly, but with trembling hands, I raised the six-shooter level with my eyes and took careful aim right between the eyes of my visitor. It was an ideal target. Only four feet away and standing full in the bright moonlight I could not miss. One shot would do the work, but—I never shot.

No, I slowly lowered the hammer; lowered it noiselessly, and very carefully tip-toed back to my bunk. I lay awake until daylight listening to my visitor thoroughly investigate the premises, unmolested. To this day I still think that was one of the wisest moves I ever made; a move indicating rare judgment.

As I stood there with that dead head between those two little black eyes, the huge outline of that grizzly began wavering queerly. It increased in size with each waver. Then the sights of that old Colt's began describing a large circle. That thin piece of mosquito netting, the only barrier between the bear and me, became so thin that it was almost transparent. The thought began chanting over and over in my mind, "suppose you miss, suppose you miss, suppose you miss." But I didn't, for as I have said, I went back to bed and the bear held the field until daylight.

When I emerged into the morning light my visitor was gone. While I appreciated this greatly I felt humiliated over the events of the night. There was nothing to do but admit that I was beaten. There and then I swore vengeance. Someway I would show this fellow that he could not make me sheepishly lie down again.

Being in charge of a large district, my work during the following week kept me away from my cabin. Several fires had sprung up and after working day and night for several days I was forced one evening to go back to my headquarters to replenish my food supply. Reaching the cabin I rode along the side toward the one door, preparatory to unpacking my pack horse. Under the window on this side I noticed several cedar shakes lying on the ground. Glancing at the roof I was surprised to see a large hole in it. Riding out to

where I could see the top of the tall fir standing at the corner of the cabin I expected to see that the "spike" top in this tree had blown down, but it was intact.

Dismounting I unlocked and entered the cabin. What met my eyes proved to me immediately that no tree had wrought the havoc that lay before me. My grub-box was wide open.

The floor and walls were covered with flour. On the floor, mixed in a grand concoction was flour, beans, rice, prunes, matches, dishes and bed clothing. Cans of tomatoes lay here and there with small round holes neatly punched in two sides, their juice sucked out. On the wall, immediately below the hole in the roof were several long scratches on the hewn surface of the log wall where my visitor had entered and made his exit when he heard me

coming. On the shakes lying on the floor were tooth and claw marks.

The solution was simple. A bear had climbed the large fir at the corner of the cabin, stepped to the roof and after ripping away enough shakes to enter had dropped down the wall to the table. After satisfying his hunger from my grub-box, he had climbed out and left. What he had not eaten he had playfully scattered over the interior before taking his departure.

This was too much. My part in the grizzly affair was still rankling, and now to have a black bear leave his card in this manner capped the climax. I had not only been kept awake at nights, but had been forced to swallow my heart upon several occasions when I had met bears face to face on the trail. But here was something that could not pass unnoticed! My vengeance now was upon all "bear-kind." The following morning, I rode into Columbus Falls for a new supply of provisions and for anything and everything that would deal misery to bears and their breed. I told my old friend, John Abbott, my troubles, and he gave me one of his fifty-pound bear-traps with full instructions for its use. Among other things, he went into detail regarding toggle on the chain. This was to be a long dry pole light enough for the bear to drag and yet heavy enough to check his flight and leave a mark to be followed in tracking and shooting him when it became light.

That evening I returned to my station and prepared my trap as instructed. I fitted the ring over the end of the toggle and wedged it. Using the clamps I set the trap and covered it with grass; then scattered some decayed fish around the set to attract the bears. When



MEET THE AUTHOR AND BOB BRATTON, THE FOREST GUARD, AND BETWEEN THEM THE PUP THAT REFUSED TO FACE THE BEAR

everything was completed I stood back and viewed my work. The toggle looked too light to successfully check the progress of a large bear. As the outlines of that old grizzly came into my mind I felt sure my pole was too light. But to cut another one and replace it was a long job and it was getting dark. Glancing around for some additional weight I noticed an old horse bell attached to a broken strap hanging on the side of the cabin. This I felt was the solution to the problem. I nailed this old strap and bell to the end of the toggle and reasoned that if the bear did run with my light toggle I could trail him by the sound of the horse bell.

I brought a chair out of the cabin and sat on the small door step until dark, watching deer feed along the lake shore. When I could no longer see I went inside, closing the door, but leaving the chair outside. There were two bunks in the rear of the one-roomed cabin, each built in an opposite corner. On the one not occupied by me, I piled up saddles and riding rig and my dog slept among these as a protection from wood rats. This dog, however, was no bear dog; in fact he was afraid of the scent of a bear. He was purely a companion and not a protector.

How long I slept I do not know. I was awakened from deep slumber by the most unearthly howl of combined rage, pain and surprise that I had ever heard and ever hope to hear. At almost the same instant some heavy, furry, squirming object landed full in my chest and its hot breath struck me in the face as it emitted a muffled moan due to my wildly clutching it by the throat. As I threw it from me to the floor one hand came into contact with the studded collar of my dog who at the first sound of the uproar outside had evidently jumped from his bunk into mine.

Outside the silence of the night was being ripped asunder by the blood-curdling howls of what I now knew to be a bear in my trap. Mingled with this great bellowing of distress was a sharp clanging of the horse bell at the end of the toggle. I grabbed the Winchester that I had carefully placed at the head of my bunk before retiring and threw the blankets from me ready to shoot it out with my captive should he attempt to enter the cabin. That rifle felt very comforting in my hands.

Suddenly the uproar became louder. It was coming toward the cabin. With rifle cocked and every muscle taut, I sat ready to defend my position as long as the shells held out. Then everything happened in a breath.

The howling, clanging roar burst out anew at the very threshold of the door. There was a terrific crash as the door flew open and in the star-lit beam of light that entered a dark object swept across the floor straight for my bunk. With record-breaking rapidity I worked the lever of that rifle. Flash after flash from its barrel roared its deadly missives toward the black object as it swiftly crossed the floor toward my bunk. Then the hammer fell with a sickening thud upon an empty chamber.

With the last report of the rifle the noise ceased, while the unearthly clamor echoed and reechoed between the towering walls of timber surrounding the lake. Over on the other bunk my dog howled low and mournfully. I could hear his teeth chattering. Somewhere out on the lake, a splashing sound, as if something was swimming, came to me.

Picture, if you can, my feelings when I awakened to the embarrassing realization that I was hanging by feet and hands to one of the beam logs directly above my bunk. Evidently I had instinctively swung up there when the rifle snapped on an empty chamber. Reluctantly I lowered myself to the bunk after I had first definitely decided that the black object lying immovable in the middle of the floor was the chair I had left on the door step before going to bed.

Refilling the magazine of my rifle I cautiously crossed the cabin and closed the door. Lighting a candle I looked the battlefield over. In the seat of the chair I found four bullet holes. In my bunk I found six empty shells. I had hit four out of six times. In the other bunk I dragged my dog from beneath my riding saddle and together we comforted each other until dawn.

At daybreak, I very cautiously looked the lake over for a drowned bear, but there was none to be found. Searching further, I discovered where the toggle had been dragged through the sand to the shore. Following the plain track of the toggle through the underbrush, I was not long in finding my grizzly, with the toggle securely "fouled" in a thicket of young spruce. He was slashing right and left at the small trees in an effort to free himself. A shot at the base of an ear laid him low. He measured better than five feet four inches from tip to tip and was a very old bear, as was evidenced by his worn teeth.

That he did not drown when he fell into the lake with a fifty-pound trap on his foot was due to the fact that he was too big for the weight that hung onto him.

THE ADVENTURE OF FORESTRY

With all the arduous duties he has to perform, the field man in forestry finds his days brimming over with adventure. In the September issue of AMERICAN FORESTS AND FOREST LIFE, J. B. Halm tells in "A Hundred and Five Miles of Rapids" of the stirring days of trail building on the National Forests. "The Bandits of Yellowstone Park," by Mildred G. Durbin, will bring you in contact with these interesting personalities of the West. "A Stranded Company," by Frank Thone---a surprising story of the little Northern hardwood forests in Florida, and "The Brown Trout" by Ladd Plumley---an article of interest to every fisherman, are just a few of the good things in this number.

Keeping Up With the Angler

By E. C. FEARNOW

THE first carload of fish shipped by the United States Fish Commission, and probably the first shipped in the United States, was sent west in June, 1873, but the consignment was lost in a wreck near Elkhorn, Nebraska. In 1874 an attempt to send a carload of fish across the continent met with success when a shipment of shad was delivered in California.

Experiments conducted during the years 1879 and 1880 demonstrated that large numbers of fish could be handled more expeditiously and economically in carload lots than in small shipments in baggage cars; so it was decided to construct cars especially adapted for carrying live fish, arranged so that an even circulation of aerated water could be maintained in the vessels containing the fish, and provided with living accommodations for the crew.

It was soon found, however, that in moving fish in carload lots, it would be necessary to provide means for aerating the water otherwise than by hand. On the first cars used the power to run the pumps was obtained by connecting a belt with one of the axles but this was very unsatisfactory as the pumps could be run only while the car was in motion. Later, a small boiler was used to furnish power for a water circulating pump but that also was found to be unsuitable.

In 1882 a friction gear was employed on one of the cars to transmit power from the car wheels. This mechanism was considered unsuccessful and was removed a few years later. When Car No. 3 was built, a small boiler and pump which had been used at the London Exposition was placed on it and used with

success for a number of years. Later it was removed and a 5 H. P. boiler and a larger pump installed. After these experiments, boilers were placed on all the cars.

Before 1893 water circulation alone was used for aerating purposes and several methods were employed to drive water into vessels carrying fish so that air would be carried with it. The first air plant was used

at the World's Fair, Chicago, Illinois, in 1893 for forcing free air into salt water used in tanks on Fisheries car No. 5.

In 1885 the first hatching outfit was placed on Car No. 3 and was used en route to the New Orleans Exposition. The hatching of eggs on the distribution cars was carried on for several years with a reasonable degree of success but as the number of regular hatcheries increased, it was found unnecessary to maintain hatching apparatus on the cars and this part of the equipment was gradually eliminated.

A number of experiments have been made in filtering and refrigerating water used in carrying fish. Filters have been made of gravel and sponge through which water was forced by a pump but they soon became clogged and unfit for use. Car. No. 3 was equipped with an air coil made of 1-inch pipe

through which water was pumped. The coil was placed in an ice box, the ice being in the center and on top of the coil, but this method of cooling water and air was found to be inefficient in proportion to the amount of ice used.

An idea of the progress that has been made in fish distribution may be gained by comparison of Car No. 2 with Car No. 9, one of the new steel coaches. Car No. 2 carried 92 milk cans or 9,200 3-inch fish. One



IN ORDER TO KEEP AHEAD OF THE ZEALOUS ANGLER,
OUR GOVERNMENT WORKERS CARRY YOUNG FISH
FRY ON PACK HORSES INTO THE BACK COUNTRY TO
BE PLANTED IN THE HEADWATERS OF MOUNTAIN
STREAMS

of the new steel cars will carry 240 pails or 24,000 3-inch fish. This increased efficiency is brought about by building cars with larger compartments and by using the same amount of water and more vessels, thereby exposing more water surface to the air. On the assumption that the present carrying capacity of one of the steel cars is 100 per cent, the efficiency of one of the earlier cars was approximately 35 per cent. Twenty-five per cent of the increased efficiency has been brought about by changes in the construction of the cars and 40 per cent by changes in the equipment. Twenty years ago the cost of distributing fish per thousand, based on the bureau's annual output, was \$0.027; during the fiscal year ended June 30, 1926, the cost per thousand fish had been reduced to a little over \$0.01.

The magnitude of the distribution work accomplished by the Bureau of Fisheries may be seen in records covering plants of fish made in the last twenty years. During that period the output of the various hatcheries amounted to 72,281,380,851 fish. In the distribution of this output, the bureau's cars travelled 2,029,416 miles and detached messengers 8,104,799 miles.

In apportioning the bureau's output of fish it is always a problem to decide on what waters are most in need of restocking and the species most suitable for introduction therein. There is a desire on the part of the public for non-indigenous fishes, and in some of the northern states where the small-mouthed black bass is common, applicants request large-mouthed black bass, while in North Carolina, Tennessee and other southern states where the waters are adapted to the large-mouthed black bass, applicants insist that the bureau introduce small-mouthed black bass. Frequently, lake trout are desired for stocking waters in southern states and in several instances insistent demands have been made for brook

trout for Florida waters. Of course, such requests cannot be granted but it requires a great deal of time and patience to convince the applicants that they should confine themselves to suitable species.

As the bureau has no representative to investigate the condition of the various streams for which fish

are desired, it is necessary to rely to a great extent on information furnished by applicants. Frequently, however, the bureau consults the state fish commissions in regard to the fish that should be placed in certain waters, this being especially true with reference to requests for spiny-finned species for trout regions.

The distribution problem begins at the hatchery and it is necessary, therefore, to use proper care in preparing the fish for shipment if they are expected to withstand the vicissitudes of transportation. Warm-water fishes, in order to be successfully transported, should be held in cool running water until they have become "hardened." The importance of "hardening" fish was recently emphasized by several shipments that were sent to Central Station, Washington, D. C. In one instance, five cans of gambusia were collected from warm stagnant water and immediately shipped. The consignment arrived in very poor condition and within twenty-four hours



SOMETIMES THE YOUNG FISH ARE CARRIED LONG DISTANCES BY RAIL. HERE TROUT ARE BEING TRANSPORTED IN PAILS ON FLAT CARS OVER A LOGGING ROAD IN WEST VIRGINIA

every fish had died. A shipment of the same species was then ordered from another station, the time involved in shipment being about the same. The consignor, in this instance, made the collection and held the fish in cool running water for about thirty-six hours. This consignment, which was forwarded to Washington, D. C., without an attendant, reached its destination in excellent condition and the fish were successfully re-shipped to various points throughout the country.

The importance of shutting off food in advance of shipment may be gained by reference to a consignment of trout forwarded from one of the bureau's

hatcheries to Washington, D. C. Two pails of fish were forwarded under identical conditions except that the fish in one pail had been fed within twenty-four hours of shipment. In the second pail the fish had not received food within thirty-six hours of shipment. On the arrival of the consignment at Central Station, the fish that had not received food for thirty-six hours were in excellent condition, while those in the other pail were in but fair condition.

When fish which have cannibalistic tendencies are to be shipped, it is quite important that they be graded so that fish as near the same size as possible will be placed in a can.

When a distribution is to be made by one of the specially equipped cars, the first matter of importance is to arrange the trips with reference to the accessibility of the applicants, who may be located in many different states. As the cars are now equipped for carrying large loads of fish, it frequently occurs that as many as 150 individual applicants are supplied on a trip. Schedules for the car and for the messengers are necessarily prepared in advance and applicants notified by letters or by telegram concerning the exact time that delivery of the fish is to be made.

It is the rule to move the car to a central point, dispatching en route messengers who either fill applications on roads parallel to lines traversed by the car or pursue a circular or semicircular route, joining the car farther along the line. The most expensive mes-



THE FISH ARE HAULED BY AUTOMOBILE TRUCK FROM THE PROPAGATING STATION TO THE DISTRIBUTION CAR

senger shipments are those in which the messenger has to retrace the same line, and the least expensive and the ones most frequently made are the circular, semicircular and triangular. Shipments off the main lines are usually made by express or in care of train baggage masters. Shipments without attendants are made to probably 95 per cent of applicants living off the main lines, necessitating over 1,000 such shipments in the course of a year.

In transporting fish an equable water temperature is of vital importance. It is generally accepted that low water temperature within reasonable limits is desirable as the cooler the water the more gaseous oxygen it holds in solution. The temperature of the water from which the fish were taken and the temperature of the water to be stocked should guide the attendant in the regulation of the temperature during the period that the fish are in transit.

For a number of years the bureau's distribution cars have been equipped with air compressors operated by 10 H. P. boilers. The air is driven through air distributors in the fish compartments, into rubber tubes leading to groups of from 4 to 6 containers and forced into the water through plugs of porous rock known as "filtros."

Too much care and attention can not be given to fish planting, as it is here that all the efforts of the fish culturist may be placed in jeopardy. The practice has been to get the fish into waters as soon as possible, frequently dumping the entire consignment into



A MODERN STEEL CAR OF THE UNITED STATES DEPARTMENT OF FISHERIES DELIVERING TROUT TO APPLICANTS FOR PLANTING

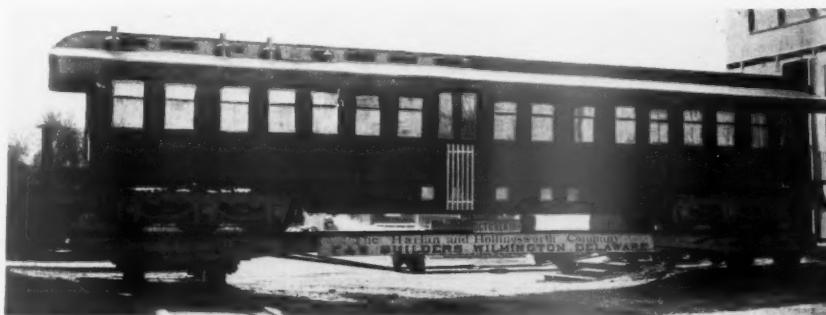
one pool at some convenient point such as a bridge or ford where the young fish merely serve as food for a few larger ones. The importance of carrying fish to the headwaters of streams where there is plenty of natural food and immunity from enemies, and depositing them in small lots in shallow spring-fed pools, is not fully appreciated by all who make plants of fish. Fish produced at great expense may be wasted by placing them in unsuitable waters, or in suitable waters under adverse conditions.

From 10,000 to 15,000 individual applications are filled annually by the Bureau of Fisheries. The distribution field includes practically every state in the Union; besides, shipments have been made to Central Mexico, Porto Rico and the Canal Zone; and only recently a consignment of gambusia was

sent from Edenton, North Carolina, to Palestine.

Five years after plants of fish are made the results are ascertained. This is the day of reckoning, for if the plants have not been successful, the applicants do not hesitate to register complaints. Thousands of reports are received—excellent 31 per cent, good 42 per

cent, fair 13 per cent, and only 14 per cent in doubt. Hundreds of letters are received testifying to the remarkable success that has followed the stocking of streams, lakes and artificial ponds



THIS WAS THE FIRST CAR, ESPECIALLY CONSTRUCTED FOR FISH DISTRIBUTION, BUILT IN THE UNITED STATES. IT WAS BUILT IN 1884

that contained no fish life prior to its introduction by the bureau.

The distribution of fish is one of the most important phases of fish-cultural work. It might be compared to the dissemination of seed grain. The end and aim is to increase the supply of desirable fish.



And Now—What of the Future?



Keystone View Co., Inc.

THIS famous old tree, known far and wide as "the tree that owns itself"—is dying. The land on which it stands was deeded to the tree itself by its owner, William H. Jackson, father of the late Chief Justice James Jackson of the Supreme Court of Georgia, who executed a deed and filed it with due formality. Coming eventually into possession of itself, it was marked with the marble slab shown, setting forth its rights, and granite posts sunk for a fence to mark the boundary of its property. Now its death, due to age and decay, involves a fine legal point, and the troublesome question will be "who owns this plot of earth to which the ancient oak holds legal title?"



Round River Yarns

III. WINNIN' THE CHAMPIONSHIP OF THE ROUND RIVER

By ROLAND HENRIONNET

WALL sir, thot cook and me war pretty friendly after I caught the fish fer him an whin we left on the wanegan we bunked together," the old camp watcher continued with a twinkle in his eye.

"It war April whin we left with five hundred million feet of logs ahead of us and towing thot there holler log behind the wanegan. The boss allowed we'd tow that holler log along being as how folks claimed it war Paul Bunyan's lost pipe stem.

"About the furst trouble we had was at some rapids about a week after we started. The logs jammed and, Mister, they piled up seventy-five feet high an 'half a mile long. We tied up the wanegan to a big tree aleng the shore and figured as how we might have to stay thar for sometime.

"Thar won't much to do so the crew spent most of thar time riding and rolling logs. An' man! thar war the best log-rollers in the country right thar. It war finally decided to hold a log-rolling contest for the championship of the Round River. You niver saw so much log-rolling in yer life. Fer a hull week every man but the cook an' meself war out thar practising an' betting war going pretty high. It finally worked down to whar a Frenchman and a Swede had the most money on them. They had rolled a big log fur three days an' nather one could roll the other off. More money wuz put up an' the men war gittin' pretty excited an' jist about fergot the log jam.

"Sez I to the cook, 'Cook, nather one of them fellers knows how to roll a log. Now if I war rollin' that log I'd have those fellers off in a jiffy.' I always liked to make thot cook think I war more of a man than he war. But I didn't figure he'd tell the men what I sed. I think he wanted to even things up a little fer the time we shined the deer an' killed the boss's hosses.

"After dinner I heerd the men callin' fer the Bull-cook an' sure enuff it war me they wanted. They carried me on thar shoulders to the river an' thin told me to go out an' show thim thar two duffers how to cuff a log.

"Sez I to the men, 'I'd rather not break into this yere contest. You have got two of the best men in the country out thar now.'

"Sez the men to me, 'The cook told us as how ye war a cham-

pion log-roller yerself.' "Sez I to the men, 'I haven't any corked shoes only me rubbers on an' the odds would all be with the Frenchman an' the Swede.'

"But they wouldn't take no fer an answer so I wint out to the log. I gits in the middle and the Frenchman on one side and the Swede on the other. The men cheered and waved thar caps an' I knowed it war up to me to win. I cuffed the log ahead fer awhile but the Frenchman and the Swede stayed on like they wuz glued. Thin I cuffed it backwards an' thot didn't help. The men on shore war hollering an' wavrin' like mad so I made one more disprit effort, cuffed it ahead jist as fast as I could an' thin backwards still faster, jumped up high in the air an' came down right an' the Frenchman an' Swede wint off! I took off me hat an' waved to the men on shore; I had won the championship of the Round River.

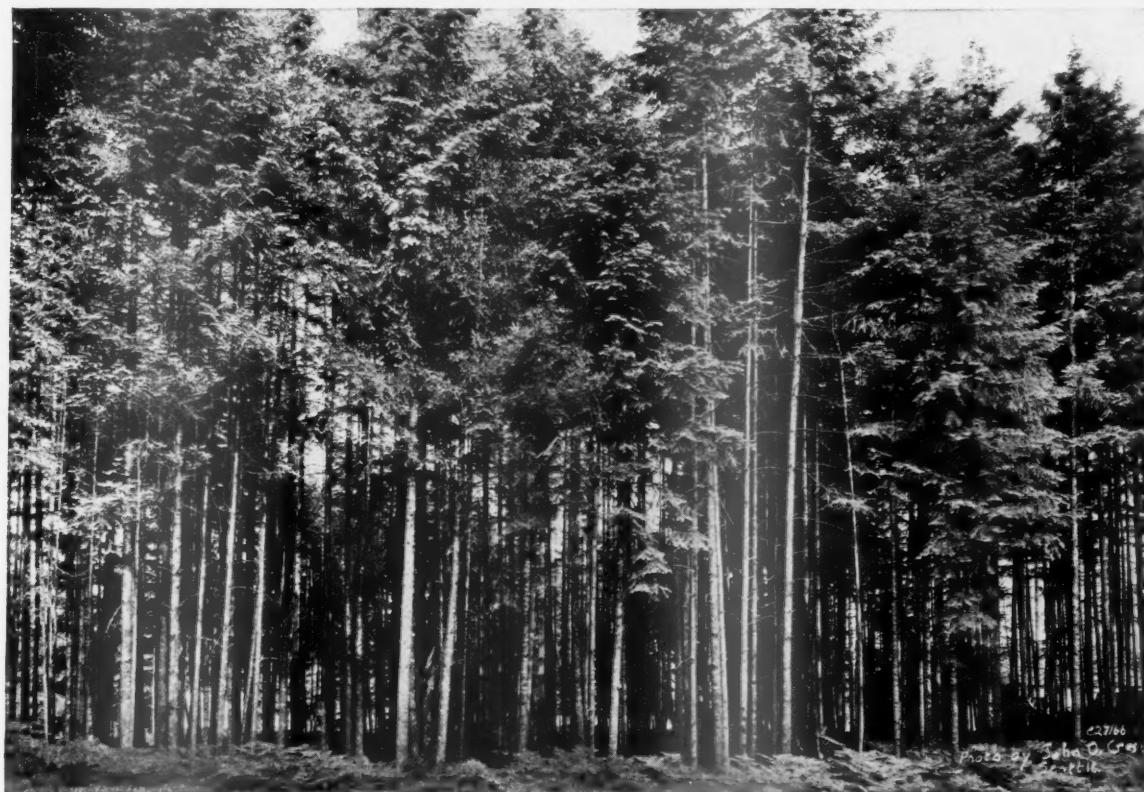
"The men war beginning to complain thot nobody but Paul an' his blue ox could ever git that log jam out. The boss had jist about given up hopes of breakin' the jam an' the legs war pilin' up higher thin ever.

"Sez the cook to me, sez he, 'If ye bane the log-driver ye told me ye are why don't ye bane got that log jam out.'

"I could have stood thot from most anybody else but from the cook it hurt me pride. Sez I to the cook, 'I'm goin' to git thot log jam out or I won't be here fer breakfast. No cook can deprecate me log drivin' abilities an' bunk with me.' So I ties a cable around the key log and puts a pulley

on a big Norway on the shore ahead of the jam. Thin I runs the cable back over the jam an' ties it to a raft of four Norway logs. The logs war a'coming down the rapids about forty miles an hour. I sees a big white pine log a'headed straight for me four logs that the cable was fastened on. An' sure enuff it hits the logs. The jam jist groaned like a dying hoss and out it went. The key log had been yanked out the furst crack. Wall, after thot the boss gits pretty nervous about the waterfalls beyond the turn in thot thar river. An' right thar I did the prettiest piece of sluicin' the river ever heard about." I didn't wait to hear the sluicing story but left the old camp watcher with a far-away look in his eyes, promising to return.

(To be continued)



Young Douglas Fir

Creating Public Interest in America's Forests

IT is interesting to note that the West Coast Lumber Trade Extension Bureau, an organization of firms and individuals engaged in the manufacture of lumber and wood products has received thousands of inquiries from people who have read its advertisements in which the forestry conservation plans of West Coast Lumbering interests are set forth.

The lumbermen of the Pacific Northwest are fully aware that the permanence of their business depends entirely upon the perpetuation of the West Coast forests. They are, therefore, applying forestry principles intensively with the basic idea that the growing of trees as a crop and the marketing of wood at a profit is the ultimate aim of forestry.

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AROUND THE STATES WITH THE AMERICAN FORESTRY ASSOCIATION

Smoking Ban in California Forests

As a fire prevention measure, the United States Forest Service announces that smoking will be prohibited in all National Forests of California, except at improved camps and places of habitation. The regulation will remain in effect until the fall rains eliminate the fire hazard.

Careless smokers, according to the Forest Service, are the greatest of the many fire menaces to the forests of California. Burning matches and tobacco last year started more than 800 forest fires in the state and caused untold damage to timber, watershed cover and grazing lands. A number of these fires swept over more than 50,000 acres.

New Forest Experiment Station in Ohio

Headquarters of the new Ohio-Mississippi Valley Forest Experiment Station will be located at Columbus, Ohio. The selection of this location was made by Secretary of Agriculture Jardine after a careful study by representatives of the department of various suitable places within the region.

The new experiment station will be operated by the United States Forest Service and will be affiliated with the Ohio State University and the Ohio Agricultural Experiment Station at Columbus. The Ohio-Mississippi Valley region which is to be covered by this station's research activities includes the States of Ohio, Indiana, Illinois, Iowa, Missouri, western Kentucky and Tennessee, and northern Arkansas.

E. F. McCarthy, Assistant Director of the Appalachian Forest Experiment Station at Asheville, N. C., has been appointed Director of this new station. Mr. McCarthy has had many years of experience in forestry work and is familiar with the forest conditions and problems

confronting the forest and woodland owners of the Central States. Other members of the experiment station include junior foresters John H. Hanley of Akron, Ohio, and Leonard F. Kellogg of Iowa, and associate forest ecologist, Bernard S. Meyer of Columbus, Ohio.

Governor Signs Florida Fire Bill

A bill making it unlawful to set fire to any forest, woods, land, or marshes, by other than the owner of such land, has passed both houses of the Florida legislature and has been signed by Governor John W. Martin. The measure was first defeated by a Senate Committee but was later restored to the calendar.

The law prescribes penalties for violations, upon conviction, of a fine not exceeding \$1000, or imprisonment not exceeding one year, or both fine and imprisonment. It also makes the convicted liable for all damages caused by such fires.

Idaho Experiments With Slash Fire Hazards

A unique experiment in better forest management has been inaugurated by six Idaho lumber companies in employing the research department of the Western Forestry and Conservation Association to cooperate with their logging forces in testing different methods of disposing of the slash fire hazard. The work is under the direction of Norman G. Jacobson, a specialist in slash disposal methods.

With logging engineers of the several companies, Mr. Jacobson is selecting different types of slash and conditions of fire risks for application of methods of brush disposal, intense protection, or a combination of the two best adapted to

obtain both economy and efficiency. The purpose of the experiments, which will extend over a period of two years, is to develop as a prominent feature in logging policy the application of the best methods that apply to slash disposal.

Forest Tax Bill Before Wisconsin Legislature

To encourage a policy of preserving from destruction the remaining forest growth of Wisconsin and of reproducing and growing adequate timber crops for the future, the Senate of the State legislature has passed a forestry tax bill providing for a severance tax on merchantable timber and an acreage tax on land designated as forest crop land.

The measure authorizes the tax commission to levy against timberland owners a severance tax on wood products at the rate of ten per cent of their stumpage value. A land tax of ten cents per acre on land designated for growing timber and other forest crops is included in the bill, and would become effective with the closing of a contract between the State and the landowner. The contract would be in force for a period of fifty years, subject to renewal at termination, or subject to cancellation at any time with the permission of the tax commission. Forest crop land is defined in the bill as land set aside for the practice of forestry.

The law would prohibit any person from cutting merchantable wood products on any forest crop land until thirty days after the owner has filed with the State Conservation Commission a notice of intention to cut. Failure to comply with this provision would be a misdemeanor and punishable on conviction by a fine not exceeding \$1,000 or imprisonment not exceeding one year, or both fine and imprisonment.



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A FIRE in an Iowa flour mill during the busy season caused a shut-down for structural repairs. Timbers were needed.

The telegraphic order reached the Weyerhaeuser Minnesota Transfer Plant at eight o'clock one Thursday morning. The timbers had to be re-sawed, and surfaced four sides. They were put in work immediately. At two-thirty that afternoon the loaded car was being switched out of the yard. At nine o'clock Saturday morning the car was being unloaded at the flour mill.

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A. F. STORGER, INC. NEW YORK, N. Y.
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Illinois to Have State-Wide System of Fishing and Hunting Grounds

A bill providing for a state-wide system of fishing and hunting grounds has passed both houses of the Illinois legislature and has been signed by the governor. A \$20,000,000 bond issue was provided for in the measure for acquisition and development.

The project will include all fishing and hunting grounds and all fish and game preserves, refuges, rest grounds and sanctuaries in the State. The land owned by the State for game and fish propagation is not included. Acquisition will be contingent upon the accessibility and suitability of the various regions, and will be spread out over the entire state proportionate to population, so that all the people will have the same opportunity to partake of its benefits. The new development will be directed by the State Department of Conservation.

Greeley Orders Flood Control Study

Because of the importance of the Mississippi Valley flood situation to forestry, Colonel William B. Greeley, Chief of the United States Forest Service, has designated as an all-service project the collection of material bearing upon the relation of forests to flood prevention and control. E. A. Sherman, Associate Forester, is in charge of the project and it will be pushed to completion with dispatch. Mr. Sherman has just returned from Tulsa, Oklahoma, where he attended a conference of interests concerned with the control of the Arkansas River flood waters.

Forestry School Dedicated in Louisiana

Authorities of the Louisiana State University expect to see a great forestry school eventually operating at Bogalusa, Louisiana, Colonel A. T. Prescott, representing President Emeritus Boyd of the university, declared at the dedication of the new school buildings on the 1,000-acre forestry tract donated to the university by the Great Southern Lumber Company, early in July.

Other speakers, among them Colonel W. H. Sullivan, vice-president and general manager of the lumber company, predicted that the forestry school of the state university will be to the South what the schools operated by Yale, Harvard and Cornell have been to the North.

Addressing more than 1,000 residents of Bogalusa and Washington parish, Colonel Sullivan said that it was the interest in reforestation manifested by the residents of the parish that made the new forestry school possible. He declared that the university authorities never would have accepted the forestry tract had there been any hostility to reforestation on the part of the residents.

It is the intention of the university to use the new tract for summer class work. During the regular school term, however, the forestry classes will use the tract at intervals for field observation.

Names National Arboretum Advisory Council

Following one of the provisions of the act of the last Congress establishing a National Arboretum at Washington, Secretary of Agriculture Jardine has announced the membership of the Advisory Council, which is to plan and develop the arboretum. The members are Frederic A. Delano, Washington, D. C., member of the Board of Regents of the Smithsonian Institution, Chairman; L. H. Bailey, Ithaca, New York, president of the Botanical Society of America; Henry S. Graves, New Haven, Conn., Dean of the School of Forestry, Yale University; Harlan P. Kelsey, Salem, Mass., former president of the American Association of Nurserymen; John C. Merriam, president of the Carnegie Institution of Washington; Mrs. Frank B. Noyes, Washington, D. C., chairman of the District of Columbia committee of the Garden Club of America; Frederick Law Olmsted, Brookline, Mass., former president of the American Society of Landscape Architects; Mrs. Harold I. Pratt, Glen Cove, L. I., secretary of the Garden Club of America; Robert Pyle, West Grove, Pa., director of the Society of American Florists and Ornamental Horticulturists and a former president of the American Rose Society.

Regulations for Upper Mississippi Wild-Life Refuge

Regulations for the administration of the Upper Mississippi River Wild-Life and Fish Refuge have been signed and issued jointly by Secretary of Agriculture Jardine and Secretary of Commerce Hoover. These regulations prescribe the conditions under which hunting and other recreational activities, including fishing and camping, will be permitted on the reservation, the general plan being to allow the public the freedom of the refuge as far as possible, consistent with the conservation of the wild life protected there. The danger from neglected camp fires is especially stressed.

The purchase of lands for the Upper Mississippi Refuge was provided for by Congress in 1924 and \$1,500,000 authorized to be appropriated for the purpose, administration being assigned to the Biological Survey and, as far as fishes and other aquatic life are concerned, to the Bureau of Fisheries. Areas of overflowed bottomlands along the Mississippi from Rock Island, Illinois, to Wabasha, Minnesota, are being acquired as rapidly as possible in the States of Illinois, Iowa, Wisconsin and Minnesota.

These overflowed lands, mostly unsuited for agriculture, include many islands above which bluffs rise precipitously on either side of the river from 200 to 400 feet high, and add unusual scenic charm to an area especially adapted to the needs of wild life. Here

fur and other wild mammals, birds, and fishes will, under careful conservation, have opportunity to increase in numbers, and the public at the same time will be given within reasonable limits the enjoyment of the sport of hunting and fishing.

4-H Members Gather at Washington

Late in June one hundred and fifty boys and girls, representatives of the National 4-H Clubs, were encamped on the Department of Agriculture grounds at Washington, D. C. Thirty-eight states were represented by delegations of four club members each, representing more than 586,000 farm boys and girls throughout the country enrolled in club work.

One of the outstanding features of the meeting was a tree planting ceremony



Roswell Griffiths, 4-H Club member from Wisconsin, presenting Secretary W. M. Jardine with a gavel containing pieces of wood representative of each of the forty-eight states.

under the direction of F. W. Besley, state forester of Maryland. Secretary of Agriculture Jardine presented each of the representatives with a gavel made of hickory and pine, the hickory from a tree which grew on the grounds at Mt. Vernon and the pine was from the old timbers removed from the White House during the present reconstruction. The boys and girls presented the Secretary with a somewhat larger gavel containing specimens of wood representing and typical of each of the forty-eight states. A piece of Alaska cedar was included for the northern Territory and the handle was of eucalyptus. Colonel William B. Greeley, chief of the Forest Service, addressed the members on "A Charge to the Tree Planters."

Oil Torches for Fire Fighting

With the need for speed ever increasing on the fire line, foresters throughout the country are constantly seeking new uses of modern equipment. An especially designed oil torch conceived to increase the effectiveness or back-firing in forest fire control has passed through the experimental stage and now bids fair to become part of every fire fighters equipment. These torches are of light weight and easy to operate. Under favorable conditions one man can set fifteen or twenty times as many back-fires as could be set with brands.

The torch consists of a one and one-half gallon steel tank tinned to make it rust proof, and is equipped with a powerful, quick acting pump, gauge, filler cap and burner valve. Adjustable shoulder straps and a backrest lighten the burden of the firefighter. The entire outfit, including hose length, weighs less than thirty pounds. The United States Forest Service and a number of State forestry departments are now equipping their fire fighting forces with them.

New State Parks in Illinois

Senate Bill 432, an act in relation to State Highways, has passed both houses of the Illinois legislature, and authorizes the Department of Public Works and Buildings to "set out trees and shrubs and to otherwise care for and beautify the roadside upon the right-of-way of the State highways in such a manner as the department may deem proper." This is the first act to be passed in Illinois relative to the beautification of the highways, with the authority placed under the Highway Department.

Senate Bill 37 provides an appropriation of \$200,000 under the Department of Public Works and Buildings for the purchase of the Black Hawk Watch Tower site near Rock River, in Rock Island County, for a State park. The largest of the remaining native stands of white pine in Illinois, near Polo, Ogle County, and the Grant City Park at Makanda, were purchased without special appropriation.

Trade Extension Committee Names Manager

Following a meeting in Chicago of the executive committee of the National Lumber Trade Extension Committee announcement was made that John M. Gibbs, secretary and treasurer of the North Carolina Pine Association, had been named manager of the trade extension department. The committee also adopted a tentative budget, which will enable the preliminary activities of the trade extension endeavor to begin at once. It approved the program for co-operating with the United States Forest Products Laboratory at Madison, Wisconsin, in certain research work into the properties and uses of wood.

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Foresters



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Forestry Contract Act Before Georgia Legislature

A bill has been introduced in the Georgia legislature that would permit land owners to contract with the state to protect their position as timber growers. The measure would authorize state and county tax officials, upon recommendation by the State Board of Forestry, to adjust the taxation of denuded land in private ownership given wholly to timber growing. By contracting with the state, timberland owners would be in a position to demand a new valuation of these lands for a period of from five to forty years, not to exceed the assessed valuation per acre at the time of contract and not less than one dollar an acre. The measure also provides for a severance tax of ten per cent on all timber cut from any forest land under contract.

Forestry Activities Changing Britain's Countryside

By A. EDWARD HAMMOND

In order to realize the extent to which reforestation is changing the waste lands of Great Britain, it is necessary to visit the Thetford Chase forest area in Norfolk, and over the borders of Suffolk. Where for many years, acres and acres of land have laid bare and barren, unfitted for cultivation, and in places not even sufficiently fertile to produce vegetation of the rankest growth, young Scotch and Corsican pines are now growing, and a tour of inspection reveals all stages of cultivation, from the seed beds to the five-year old plantations.

For reforestation purposes, England is split up into five divisions, and the Thetford area embraces the counties of Norfolk, Suffolk, Lincoln, Northampton, and Cambridge. The area so far acquired comprises 29,000 acres, which, for all intents and purposes, is enclosed in a one-ring fence, if roads and other necessary breaks are not taken into consideration. Much of the land has been purchased by the Forestry Commission; but, in several instances, whole estates have been leased for long periods.

Following the acquisition of a particular tract of land, the first problem which presents itself is rabbits. In this particular district, these rodents are particularly numerous, having been allowed to breed and multiply without any serious interference until the forestry officials took up the problem. As soon as a new area is taken over, it is entirely enclosed by rabbit-proof fencing. This fence consists of cleft stakes, ten feet apart. A single strand of barbed wire is stretched taut at a height of 3 feet, and 18-gauge wire-netting 42 inches wide, with a 1½-inch mesh is then hung from the bars of the wire and attached to the posts with staples. Six inches of the wire is laid along the surface of the ground at right angles to the fence, and anchored by means of sods at every three feet or so. This has proved a successful deterrent against rabbits. The pests are dealt with inside the enclosure by means of traps, snares, and dogs.

The next important consideration is the establishment of precautions against fire. Fire rides are arranged at intervals in the planted areas. These are kept clear of vegetation, and thus provide an effective means of checking any outbreaks, and also serve as points from which counter or back fires may be started. Fire lines are laid down between compartments and along boundaries varying in width up to 100 feet. Hardwood species, which, in comparison with conifers are non-inflammable, are being planted alongside the fire lines and rides. In the Thetford area, a wide strip of beech plantation divides the forest into two complete halves.

Rapid progress is being made with

planting in this district. By the end of this present planting season, 9,000 acres will be planted, while the program for this year is 4,800, making a total of over 13,000 acres. Complete success has been achieved with direct sowings in many of the East Anglian districts which have light soils, and 100 acres of direct sowings have been made at Thetford during the last season.

Owing to the relatively level state of the ground in this district, it has been found possible to make use of a tractor for plowing purposes. This turns up two furrows at a time, four and a half feet apart.

Eighty acres of nursery are established in the Thetford forest area. These consist mainly of seed beds of Scotch and Corsican pine. Parts of this area were given up to forests before the war, and large contingents of Canadians were engaged on fellings at Santon Downham for timber for war purposes. A large proportion of this land is now to be cleared in preparation for planting. Belts of old trees have been allowed to remain in places, and from these 2,000 bushels of cones were gathered this year, and dried for seed purposes.

Foresters Meet At Cranberry Lake

The summer meeting of the New York State Section of the Society of American Foresters will be held at the State Ranger School on Cranberry Lake at the invitation of the New York State College of Forestry. It is understood that the new State Ranger School building will be dedicated at this time and that a large number of foresters from the surrounding states will attend the meeting. Dean Franklin Moon of the College of Forestry at Syracuse is in charge of arrangements.



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Massachusetts Attempts Quail Propagation

A quail breeding experiment which, if proven practicable, will make it possible for the planting each spring of the little game bird in various areas of Massachusetts, has been announced by William C. Adams, director of the Division of Fisheries and Game of the State Department of Conservation. Thirty-seven pairs of native adult birds have been captured for the experiment. The department plans to gradually increase the stock of adult quail until several thousand pairs can be released annually. This, according to Mr. Adams, will restore the quail to many of the over-hunted areas of the state.

Fires Menace Alaskan Reindeer Industry

Forest and range fires are a particular menace to the development of the future reindeer industry in Alaska, according to the Biological Survey, United States Department of Agriculture.

Fires are declared to constitute one of the greatest sources of injury to forage and forest production in Alaska and cause large losses in fur and game. Tundra and forest fires in the interior are common, and large burned-over range areas are frequently found. The fires are often set by prospectors to clear off the vegetation and expose underlying ground and rock, and many are caused by carelessness in leaving camp fires or by tossing away lighted matches or cigarettes.

In the northern and western part of the Territory are vast areas of grazing land of luxuriant forage especially suited to the raising of reindeer. A part of this area is now so used, the present herds totaling approximately 400,000 head.

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BOOK REVIEWS

FOUNDATION PLANTING, by Leonard H. Johnson. Published by A. T. DeLa Mare Company, New York City.

This book is designed to aid the house owner in planning his home surroundings. It gives advice in choosing plants from the standpoint of beauty, cost and care. The book is replete with photographs of a variety of homes, depicting good and bad foundation planting. By the use of plans which give the names, both technical and common, of the plants shown in the photographs, the reader quickly learns the varieties best adapted to different places about a house, those which group themselves most artistically, and those which are most hardy or effective. The book is not meant for use in extensive plantings on large estates, but mainly for the city or suburban dweller who wants a carefully planned, easily managed foundation planting, and one that will be moderate in cost.

ANIMAL FRIENDS, by Harriet A. Cheever. Published by L. C. Page & Company, Boston.

This is a collection of five stories, the first the adventures of a canary, the next those of a pony, and the other three those of a cat, a bunny and a dog. Each animal hero or heroine is made a real character that lives a real life. They think and talk intelligently, as undoubtedly our animal friends do, and their experiences make delightful reading. Miss Cheever has woven into her accounts of these pets' lives worthwhile suggestions for their care, and her book would make any girl or boy appreciate more the value of loving with deed as well as word these faithful creatures. The book contains a great number of pen and ink sketches that add greatly to its attractiveness.

MY WILD FLOWER GARDEN, by Herbert Durand. Published by G. P. Putnam's Sons, New York—London. Price, \$2.50.

This is a delightfully presented little book on the making of a wild flower garden, and its 7 by 4½-inch covers enclose a vast amount of information on this type of gardening. Mr. Durand discloses the secrets of the places to find and the places to plant the common and rare variety of wild flowers. One of the best helps is a chapter which describes the various kinds of soil and the flowers that thrive in them. One chapter devotes itself to "soil acidity" and is based on some original material supplied by Dr. E. T. Wherry. Mr. Durand

takes step by step the preparation and care of the garden. The photographs which illustrate the book are exceptionally good, and the colored frontispiece which gives the reader a peek into the author's garden is especially inviting.

LIFE IN A MAN-OF-WAR, by A Fore-top-Man. Houghton Mifflin Company, Boston and New York. Price \$10.00.

This is an account of a sailor's voyage on "Old Ironsides" in 1839. The author is only known as a "Fore-top-Man," but whoever he was we are indebted to him for a most interesting and valuable contribution to nautical literature. The book has been reprinted verbatim from the original edition of 1841 without correction, and the result is not only informative but entertaining.

There are included amusing incidents on board ship, noteworthy events in history; verses of great length and novel construction written, it seems, on the slightest provocation; sea yarns as impossible as only sea yarns can be, and all the color, action and human interest that must necessarily have made up the life of the crew on the old "Constitution."

The book contains photographs of old documents, models of the frigate, pictures of activities on board and portraits of several of the ship's officers. Rear Admiral Elliot Snow has written a preface which explains and verifies some of the incidents and statements.

The supply is limited to only seven hundred and fifty copies.

THE PRACTICAL VALUE OF BIRDS, by Junius Henderson. The Macmillan Company, New York. Price \$2.50.

Mr. Henderson has prepared an excellent book for use by those who want to know about the birds but have never had the time to wade through volumes of data to obtain just the information they desired. The author of "The Practical Value of Birds" has done this for them and presents a compilation of the more important facts and principles in a single volume for ready reference.

The first part of the book is devoted to a general discussion of birds, their value, relation to farm crops, orchards, forests and poultry yards and also to protective and propagating methods. The second part takes up the orders, families and species of birds, and discusses their habits of living and eating.

—G. I. N.

The reader is furnished with numerous footnotes and references to the great number of volumes from which Mr. Henderson has collected his information. A bibliography is also appended.

EDITORIAL SILENCE, by Robert T. Morris. Published by The Stratford Company, Boston. Price \$2.50.

This book, just issued, is a criticism of modern journalistic methods and a prophecy of what the next stage in journalism will be. The author is well qualified to criticize and prophesy, and he does both in a constructive, entertaining manner. Readers of Doctor Morris' contributions to *The American Nut Journal* and his former books will be interested in his latest work.—G.I.N.

Describes Forestry Profession

Although forestry has gained recognition as a profession only within the last 30 years today there are more than 1,500 young men in the United States studying for foresters' careers, and forestry is a recognized profession charged with the solution of one of the country's greatest economic problems—that of putting to the best use 470,000,000 acres of forest land.

The requirements, opportunities and ideals of the forester's profession have been set forth by Edward A. Sherman, Associate Forester of the United States Forest Service, in a new bulletin, "Forestry as a Profession."

The first recognition given to the idea that forestry work required special technical training, says Mr. Sherman, was in 1898, when Cornell University established a professional school of forestry. Since that time 23 institutions have included courses leading to a degree in forestry, and 50 others now include forestry in their curricula.

Opportunities for employment of trained professional foresters are constantly increasing, according to the bulletin. The Federal Government, the States, counties and municipalities, many lumber companies and private owners of timberland, wood-using industries, educational institutions and organizations conducting research in forestry all employ technical foresters. With the aid of the Government and the States under the provisions of the Clarke-McNary Act, reforestation by private owners is steadily assuming increasing importance.

New Canadian National Park

One thousand three hundred and seventy-seven square miles, comprising a portion of the primitive forest and lake country of northern Saskatchewan, Canada, has been set aside as a great scenic playground under the name of Prince Albert National Park. The creation of

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April, September, October, November, and December, 1921.

October and November, 1922.

January and December, 1923.

It will be appreciated if readers having copies of these issues, for which they have no further use, will send them to the Association so that they will be available to libraries, schools, and individuals who wish to complete certain volumes.

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this new park which has been announced by the Minister of the Interior is in continuation of the policy of the Dominion Government to preserve areas of outstanding natural beauty as national recreational reserves and wild life sanctuaries for the benefit, use, and enjoyment of the people of Canada.

R. D. Forbes will Head New Allegheny Forest Experiment Station

Secretary of Agriculture Jardine has announced the appointment of R. D. Forbes as the Director of the Allegheny Forest Experiment Station which is being established this month. The Allegheny Station will serve the forest interests of Pennsylvania, Maryland, Delaware and New Jersey.

After graduation from the Yale Forest School, Mr. Forbes spent three years as a forest assistant on National Forests in Arizona and New Mexico, resigning from the Forest Service to become Assistant State Forester of New Jersey. Here for two years he has engaged chiefly in the development of the State Forests and in giving advice to forest landowners. In 1917 he was made State Forester of Louisiana and the first forester to be appointed for that State, holding the position for four years. Since 1921 Mr. Forbes has been the Director of the Southern Forest Experiment Station, the largest of all the regional forest experiment stations in the Forest Service, with headquarters at New Orleans, Louisiana.

New Jersey Opens State Park

Dedicated to one of the most important historic events in the making of our nation, the Washington's Crossing State Park in New Jersey, has been officially opened. The park marks the spot where General George Washington and his troops made their memorable crossing of the Delaware River 150 years ago.

Governor A. Harry Moore officially accepted the park on behalf of the State. The presentation was made by H. F. McConnell, president of the State Board of Conservation and Development. A number of memorials were also presented to the State by the Sons of the American Revolution and the Daughters of the American Revolution. Major General William Weigel of the Second Army Corps, and Newton A. K. Bugbee, State Comptroller were the principal speakers. State Forester C. P. Wilber was in charge of the dedication.

All of the old historic landmarks of the memorable spot have been carefully preserved and restored. The McKonkey Ferry House is replete with furnishings and trappings of the Revolutionary period. Another feature of historical interest is an old lane from the River road to Bear Tavern, along which Washington's army marched prior to the advance on Trenton.



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The Tree Care Service Bureau is an organization of leading local tree specialists, who simplify routine work with intelligent service to obtain economical and lasting results: pruning, root feeding, spraying, cleaning out and filling rotting holes with materials that particular cavities will carry and frequently cover with new growth.

START WITH A SIMPLE INSPECTION of one tree or many. Write for inspection dates in your locality.

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[Also, on request we will send you information on cleaning up woodlands. "Economy and Efficiency in the Woodlot"—lovely tree park results!]

ASK FOR GOVERNMENT BULLETIN, free if you are interested in the inspection of your trees by a member of this Bureau. Address:

TREE CARE SERVICE BUREAU
A-27 Great Oak Lane, Pleasantville, N. Y.

Two Named To Lake States Forest Research Advisory Committee

Appointment by Secretary of Agriculture Jardine of two new members to the Lake States Forest Research Advisory Committee has been announced by Raphael Zon, Director of the Lake States Forest Experiment Station, St. Paul, Minnesota.

The two new members are Dr. Henry C. Cowles of the Department of Botany, University of Chicago, and O. L. E. Weber of the Watab Paper Company, Sartell, Minnesota, who were appointed to serve on the Committee for two-year terms. They succeed E. E. Parsonage, of Minneapolis, Minnesota, and A. T. Roberts, of Marquette, Michigan, who served on the Committee for the last four years, and whose terms of appointment have expired.

The Advisory Committee acts in cooperation with the Forest Service in correlating the research activities of the forestry agencies in the region in advising the department as to the research program of the Lake States Experiment Station, and in assisting to bring about better forest practices throughout the Lake States region.

North Carolina Advances Fire Protection

Highway maintenance patrolmen in North Carolina will in the future assist in the program of forest fire protection under terms of an agreement recently entered into at a conference between Governor A. W. McLean, Chairman Frank Page of the State Highway Commission and Director Wade H. Phillips of the State Department of Conservation and Development.

Details of the plan are being completed, and active cooperation of highway patrol forces is expected to begin as quickly as these can be placed in the hands of road groups. This action will bring what will amount to an auxiliary force of approximately one thousand men as guardians of the forests to assist the regular warden force of nearly three thousand men in the suppression and reporting of fires that occur near or within a reasonable distance of any part of the State highway system.

According to Chairman Page, there is an average of around three men to a maintenance squad on about every twelve miles of highways in the State system of six thousand odd miles of State highways. The extent of this cooperation, according to the agreement of the officials, will be in the suppression of small fires wherever located along or near the highway and in notifying wardens of the presence of fires in the neighborhood.

No Dust Mars the Pleasure Here



Dust is entirely eliminated from Solvay-treated driveways, tennis courts and recreation grounds.

Solvay, a white, flaky material, when spread on the road absorbs moisture from the air and retains it on the treated surface, keeping the surface slightly moist and therefore **free from dust**.

It also penetrates below the surface and acts as a real surface binder.

Solvay Calcium Chloride

is odorless and harmless; will not track or stain. It maintains dirt, gravel and macadam surfaces in dustless, compact condition at less cost than any other method. It is an investment that promotes better health and greater pleasure.

Write for booklet No. 5757

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40 Rector Street, New York

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"Can you tell me where I can get about 500 Japanese Barberry bushes for hedge and enclosure for a bird sanctuary?"

"Can you enlighten me where I can purchase a small size automatic 25 foot reel?"

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"Where can I purchase Koster's Blue Spruce. Also where can I get Cedrus Atlantica Glauca in any size?"

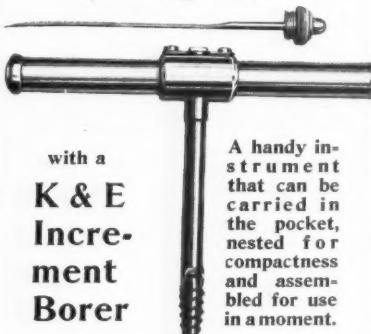
"Can you tell me where to procure at a reasonable price 10,000 Red Pine 3 year transplants?"

"Is it possible to obtain information on the raising of mink and raccoon in quantity for commercial purposes. Also can you put me in touch with breeders of these animals?"

The above inquiries are selected at random from our Service Department mail. They are all answered fully and promptly. Let us help you.

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JAMES W. SEWALL
Consulting Forester Old Town, Maine

To Reforest Platte River Watershed

The first step in a long-swing program for reforestation of 55,000 acres of land in the Platte River watershed has been taken by the Forestry Committee of the Chamber of Commerce of Denver, Colorado. The purpose of the work is to conserve and develop the water supply of the city.

Following a survey of the Platte River area it was decided that reforestation would prevent rapid thawing of snow and bring about more orderly runoff of water during the summer months. By retarding excessive spring run-offs of water it will diminish flood hazards and thus eliminate loss of irrigation water incident to floods. Most of the area is widely scattered over the watershed on the Pike and Leadville National Forests. From forty-five to fifty million trees will be required for the planting. Three years' time will be required to

grow trees to sufficient size before they can be planted. The total cost will exceed \$500,000.

Blight-Killed Chestnut

Side lights on the probable extinction within a few decades of the chestnut tree are given in a new circular published by the United States Forest Service, "The Natural Replacement of Blight-Killed Chestnut," Miscellaneous Circular No. 100-M.

Until a few years ago the chestnut furnished a greater variety of valuable wood products than any other eastern hardwood, says the bulletin, and constituted nearly half of the hardwood forests of New England, New Jersey and Pennsylvania, as well as a large proportion of the hardwoods of the Appalachian Mountains. Now, because of the ravages of the chestnut blight, it is a doomed tree, if no unforeseen circumstances check the disease.



THE SACRED OAK OF OLEY VALLEY

To Preserve a Famous Tree

The Sacred Oak of the Oley Valley, Pennsylvania, is an aspirant to the "Hall of Fame for Trees." It is estimated to be five hundred years old, and is entitled to a place in the "Hall of Fame" because of its interesting history. This latter has to do with the Delaware Indians who used the tree as a shrine ever since a tribal chief received answers to two prayers made to the Great Spirit at that same spot.

The old oak has many wounds in which decay has begun, and because of

its age and weight many of the limbs will have to be cabled. Solan L. Parkes, tree surgeon and conservationist of Reading, has purchased the plot of ground on which it stands, and is undertaking to preserve it for future generations. The tree measures 22 feet 3 1/2 inches in circumference a foot above the ground, and is about 75 feet high. Its spread is 110 feet. It is thought to be the oldest living thing in the locality of Oley Valley.

Forestry Exhibits in New York

Twenty-three counties in New York will have reforestation exhibits at the county fairs this fall. A standard exhibit has been prepared by the Conservation Department that will give an intelligent idea of the manner in which forestry projects may be started and the benefits that will result from them. There will be one and two year old seedling trees and three year old transplants growing just as taken from the state's nurseries. In a number of counties, trees from 8 to 15 years old taken from local plantations will be transplanted to serve as a background for the tiny trees ordinarily furnished for planting stock. These larger trees will serve to show what can be produced on local soils in a comparatively short time. In addition, there will be charts applicable to the county and literature dealing with the whole subject of reforestation.

Campers in California Must Carry Fire Tools

Under authority from the Secretary of Agriculture, District Forester S. B. Show, of the United States Forest Service, has designated the National Forests of California and southwestern Nevada as areas of fire hazard, and has issued orders that all camping parties entering the Government forests must carry at least one shovel and one ax per automobile, or

per pack outfit, such equipment to be of a size and character suitable for fire fighting purposes. This order became effective June 15, and will continue throughout the fire season. The person in charge of a camping or pack outfit party will be held responsible under Federal laws for any violation of the order.

The purpose of this new regulation is to further safeguard the National Forests from damage and destruction resulting from unextinguished camp fires. Records show that in the past five years a total of 1,150 camp fires were left burning in the state by forest users, sportsmen and recreationists. A considerable number of these became conflagrations and caused serious loss of timber.

Davey Tree Company's New Home

An arboretum that will contain every kind of tree and shrub that can be grown in this climate, is to be one of the features of the new half million dollar home of the Davey Tree Expert Company of Kent, Ohio. Martin L. Davey, president of the company, conceived the project as a memorial to his father, John Davey, originator of tree surgery, and as a shrine for nature lovers throughout the world. The site has just been purchased from the Twin Lakes Company. Plans are to be completed this year, and construction will be begun in the spring of 1928.

Due to the great number of inquiries from tree owners who wish to fill one or more cavities with "Tree Cork," we have arranged with our factory to pack and ship with full directions of application, for \$5.00, enough materials to fill a fair sized cavity and if further information as to the proper method of procedure is desired, we will upon receipt of a sketch or photograph of the cavity, advise you as to how the best results may be obtained from your work.

The Van Yahres Cork Method and the Filling itself is protected by patent number 1,624,820 and the service and materials can only be had through us.

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Thomas Jefferson Memorial Foundation
National Headquarters 103 Broadway, New York City



Mr. George Van Yahres, President
Van Yahres Tree Service
Westbury, Long Island

My dear Mr. Van Yahres,

We have received your statement of the actual cost and value of the tree surgery work which you performed on the original tree planted by Thomas Jefferson at his home, Monticello, situated at Charlottesville, Virginia. We are very pleased to find that you very patriotically donated to Monticello a considerable portion of the value of the work. The balance has been paid to you by the Committee of the Garden Club of Virginia which raises the special fund for this purpose.

When the Thomas Jefferson Memorial Foundation obtained legal title to Monticello, it had no knowledge of the previous history of the tree and had been planted there by Thomas Jefferson almost a century and a half ago in very poor condition. We were very pleased, therefore, when the Honorable Charles E. Murphy brought the matter particularly before the House of Delegates of Virginia, and I immediately organized a very efficient Committee under the chairmanship of Mrs. William B. Mason of Greenwood, Va.

This Committee made a thorough investigation and chose your organization for the work which immediately proceeded under your personal supervision. I am very interested in reading the publication you have mentioned concerning the tree surgery work done at Monticello and take considerable delight in showing the remarkable tree surgery work which you had performed on these trees in December, 1926, at Monticello, and in January, 1927, at the old house at Westbury, Long Island. I also recently visited Monticello on July 4th this year. The Committee of the Garden Club of Virginia followed the progress of your work very carefully and reported to the Foundation that they were thoroughly satisfied with your accomplishments.

On behalf of the State of New York, Governor of the State, and the Thomas Jefferson Memorial Foundation, I wish to extend to you my sincere thanks for the excellent work you have done in curing the Jefferson trees and I assure you that we are deeply grateful for your donation of a large part of the actual value of this work.

Assuring you of our deep appreciation, I am

Very truly yours,
Thomas L. Rhodes
Thomas L. Rhodes, Superintendent at Monticello

The trees treated in the spring of 1926 were inspected in the fall and found in excellent condition and healing rapidly. Just recently the following report was received:

"All trees are in good general condition and cavities are healing nicely."

—(Signed) Thomas L. Rhodes, Superintendent at Monticello.

ONLY 60 DAYS MORE

Effective October 1, 1927

The prices of Hough's American Woods and Handbook of Trees will be increased as follows:

	Present Price	New Price
AMERICAN WOODS (Cloth) per vol.	\$7.50	\$10.00
(Morocco) per vol.	10.00	15.00
HANDBOOK OF TREES (Cloth)	8.00	8.00
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By ordering before October 1st you can secure these books which should be in every Forester's and Tree Lover's library at a substantial saving.

HOUGH'S AMERICAN WOODS

A publication illustrated by actual specimens (showing the end, "quarter" and "flat" grains of each wood) with text telling uses, properties, distributions, etc. In 13 volumes, each showing 25 species.

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When cavity filling becomes necessary in your trees, you should select a method and material that will provide an affinity to the characteristics of the tree in its natural expansion and contraction.

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**142,500,000 Feet
National Forest Timber
FOR SALE**

LOCATION AND AMOUNT.—All the merchantable dead timber standing or down and all the live timber marked or designated for cutting on an area embracing about 45,500 acres in T 28 N., R 5 E.; T 29 N., Rs. 2, 3, 4 and 5 E.; T 30 N., Rs. 2, 3 and 4 E., G. & S. R. B. & M., Grand Canyon Unit, Tusayan National Forest, Arizona, estimated to be 142,500,000 feet B. M., more or less, of western yellow pine sawtimber, and an unestimated amount of western yellow pine tie and mine prop timber to be taken at the option of the purchaser.

STUMPAGE PRICES.—Lowest rates considered, \$2.25 per M. Rates to be readjusted every three years.

DEPOSIT.—\$10,000 must be deposited with each bid to be applied on the purchase price, refunded, or retained in part as liquidated damages, according to conditions of sale.

FINAL DATE FOR BIDS.—Sealed bids will be received by the District Forester, Albuquerque, New Mexico, up to and including September 1, 1927.

The right to reject any and all bids is reserved.

Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, Albuquerque, New Mexico, or the Forest Supervisor, Williams, Arizona.

New Palisades Park Superintendent

The Commissioners of the Palisades Interstate Park, New York, have announced the appointment of Major Daniel W. Colhoun as Superintendent of the New Jersey section of the park, the Palisades of the Hudson, extending from Edgewater, N. J., to the New Jersey-New York boundary. Major Colhoun succeeds Scott Knowles, who has been assigned to the Blauvelt and Hook Mountain sections, Rockland County, N. Y., where the Commissioners are soon to begin the development of the Hook Mountain division.

Major Colhoun was previously connected with the park service, having been engaged in the location and construction of the Henry Hudson Drive, between Englewood Landing and Alpine, in 1914. After three years at West Point he entered the engineering service of the Commission in the Harriman State Park, where he built the dam for Lake Tiorati, and also worked on the Seven Lakes Drive, the main motor highway through the Park. In his work on the Henry Hudson Drive on the Palisades, he designed and built the concrete bridge at Green Brook Falls, opposite Spuyten Duyvil, which is one of the beauty spots of the Drive.

Forestry Meetings in New Hampshire

The annual conference of the Society for Protection of New Hampshire Forests will be held at Dover, New Hampshire, August 31 to September 2. The New Hampshire Forestry Commission and the Appalachian Mountain Club will take part in the meeting. The program includes extensive trips into the Parker Pawtuckaway mountains.

The annual Yale Forestry Conference will be held on the 2,000-acre forest of the Yale School of Forestry near Keene, New

Hampshire, September 3. The summer field meetings of the New England Section of the Society of American Foresters will be held in the White Mountain National Forest, September 6 to 8. The New York Section of the Society of American Foresters will meet at the Ranger School of the New York State College of Forestry at Wanakena, New York, August 29 and 30.

Forestry Club In New York Schools

As the result of a gift of young forest trees for planting made by the Hon. John D. Clarke, co-author of the Clarke-McNary forestry bill, to the boys of the public schools of Walton, N. Y., Sheldon E. Brink, superintendent of schools, is now planning to organize a forestry club to be made up of boys and girls who are interested in the preservation and perpetuation of trees.

Sargent Memorial Fund Reaches Half Million

In order that the Arnold Arboretum at Jamaica Plain, Mass., which contains the greatest collection of hardy trees and shrubs in the United States, may be perpetuated and enlarged, friends of the late Professor Charles Sprague Sargent are raising a fund to continue its work. The Boston Committee formed to raise the Charles Sprague Sargent Memorial Fund for the endowment of the Arnold Arboretum announces that half of the \$1,000,000 fund considered necessary to carry on this work, has been raised. A National Committee and other local committees are now being formed throughout the country so that nature-lovers everywhere may have an opportunity of contributing to the tree garden which contains more than 6,500 species and varieties of trees and shrubs.

NOMINATE YOUR FRIENDS FOR MEMBERSHIP

Fill in the last line and mail the application to a friend. He will appreciate the courtesy.

Application for Membership in The American Forestry Association

Date.....

The AMERICAN FORESTRY ASSOCIATION

1523 L Street, N. W., Washington, D. C.:

I hereby apply for membership in The American Forestry Association
and enclose \$.....

INDICATE CLASS OF MEMBERSHIP DESIRED

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| <input type="checkbox"/> Subscribing membership, per year, including Magazine..... | \$4.00 |
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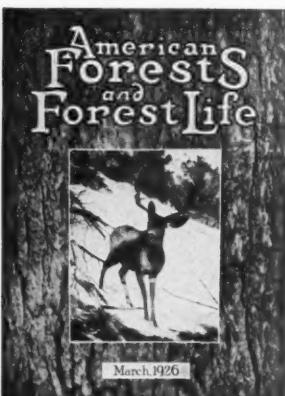
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Nominated by

August, 1927



American Forests and Forest Life is sent monthly to all except Annual Members

Tennessee Club Awards Essay Prizes

The Lumbermen's Club of Memphis, Tennessee, has awarded a prize of \$25 to Iverson Walker, student of the Central High School at Memphis, for the best essay on "Reforestation." The prize was offered by the club through the girls' reserve committee of the Girl Scout organization. A second prize of \$15 was awarded to Carolyn Glenn, student of the Millington High School, Millington, Tennessee, and third prize of \$10 to Lara Bell Watkins of Messick School, Memphis.

Forest Service Features Collection of Range Plants

Nearly 60,000 range plants of more or less importance to the grazing industry in the National Forests have been collected by the United States Forest Service.

Representing about 8,000 distinct species of plants, the Forest Service herbarium in Washington is recognized as the best and most complete economic collection of its kind in the United States. Accompanying each plant specimen are notes by the collector on its forage value, growth requirements and other points of interest. Collecting has been carried on continuously for the past twenty years, and the present herbarium represents the work of approximately a thousand collectors. In addition to the value that the collection and the studies made in connection with its preparation have had locally, the herbarium has been the basis for a number of authoritative publications on range plants.

Montana Begins Air Patrol

Aerial forest patrol over the National Forests of Washington, Idaho and Montana began late in June, according to E. C. Flint of the United States Forest Service, Missoula, Montana. Two De Haviland planes, with Liberty motors, have been obtained and will be piloted by national guard pilots. Landing fields have been established at Spokane, Washington, and Missoula, Montana.

Readjustment of Lumber Industry

Reports from approximately five hundred of the chief lumber mills of the country to the National Manufacturers Association indicate that the readjustment of the lumber industry to generally altered economic conditions is still in process. Although business has been for several months less than last year, and production has decreased accordingly, the curtailment continues. The reporting softwood mills showed a decrease of about 11,000,000 feet in new business, as compared with the immediately preceding week, and production fell off about a million feet, although there was an increase of 5,000,000 feet in shipments. As compared with a year ago, and making

calculations for a smaller number of reporting mills, new business is about ten per cent under last year's at this time. This year's current production bears about the same relation to last year's, while shipments have not fallen off quite so much.

Hoo-Hoo Annual at Miami

The thirty-sixth annual meeting of Hoo-Hoo International, to be held in Miami, Florida, has been postponed from September 8, 9 and 10 to November 9, 10 and 11. The meeting will be formally opened at 9.09 a.m., September 9, in accord with the traditions of the order, and adjourned to November 9. W. W. Brock, of Miami, supreme junior Hoo-Hoo, will officiate at the formal opening and declare the adjournment.

British Empire Forestry Congress

The next British Empire forestry congress is to be held in Australia and New Zealand in 1928.

The committee on arrangements has suggested the attendance of some 32 members from parts of the Empire other than the two commonwealths directly concerned. Features of general interest will be discussions of the Imperial timber supply and consumption, research in silviculture and products, forest management, and the formation of an Imperial forestry bureau to serve as a general clearing house for information.

SMITH INDIAN FIRE PUMP

A well built fire pump for long hard service

**Easily Carried and Operated by Anyone**

The Indian can not be excelled for fighting forest fire, brush fires, grass fires, in fact for fighting fires anywhere.

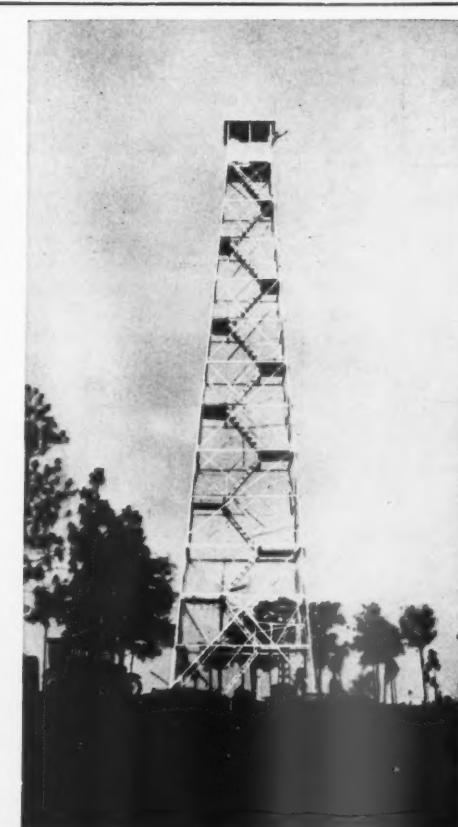
The Knapsack tank, holding about 5 gallons, is conveniently carried on the back, similar to a pack basket. It has a detachable strainer, preventing any sediments or rubbish entering when dipped into stream or lake for filling. The pump is entirely of heavy brass and has no leather packings or parts to play out or wear out, and is always in working order ready for any fire emergency. One brass cylinder works back and forth inside the other, and slow easy pumping throws a powerful 50-foot stream to any point desired.

The Indian is easily carried over logs and hilly places, and quickly extinguishes fires in trees, crotches, stumps, etc., and is highly recommended. Used on private estates, private and public parks, private and public lumber preserves, state and federal preserves. No forest either small or large should be without this fire pump.

Write for descriptive circular and prices on the Indian and other styles.

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Galvanized Steel Towers FOR THE Forest Service

Our long experience in designing and building a great variety of steel towers has enabled us to produce this superior line of towers for Observation and Fire Protection purposes.

The house at the top of the tower is 7-ft. square. It provides comfortable quarters for the observer.

The illustration shows an 80-ft. tower of the LS-40 type. It was erected at Kirbyville, Texas, for the State Forestry Department. This tower has a regular stairway, with a railing on both sides, from the ground to the cabin. It is safe and easy for anyone to climb. The prices are moderate.

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used by Municipal, County and State Highway Depts. for cleaning weeds from street gutters and curbs, roadsides, irrigation ditches, etc.

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used by the U. S. Forest Service—for cleaning fire trails, slash disposal and for back firing on forest fires.

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HAUCK MANUFACTURING COMPANY

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For Fighting Forest Fires, Brush Burning Scorching Fox Pens and Kennels
Made in 4 sizes, priced \$25.00 to \$60.00
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RIGHT from start to finish.

Write for NEW Illustrated Catalog
with Samples and Prices attached

Write for our Shirt Folder

SMITH-GRAY

729 Broadway New York

Tramping in the Great Smokies

(Continued from page 466)

turns brown in summer; in winter hit's black as can be. Same bear." As for snakes, copperheads and rattlers are the two most dangerous kinds. But in all my years of tramping in the Smokies I have seen only one snake, and that a diamond back rattler, and my inquiries among the natives have revealed only four authenticated cases of people being bitten by snakes.

The southern mountaineer is an interesting character. He may be uneducated, but he is not uncultured. Neither is he stolid and stupid, as some writers insist; rather he is cautious, with a backwoodsman's caution. From personal observation I have found the mountain people to possess a keen sense of humor and a vivid imagination. No one can tell a bigger yarn with a straighter face.

Here is one told by a guide to a girl from the East, who kept bragging about the size of the mountains where she came from:

How We Saved Our Tree from Insects

(Continued from page 482)

wire which I fashioned into probes, or small chisels of various shapes and a pound of ordinary putty.

We soon found that the work we had undertaken was a tedious, dirty and smelly job. My wife must have the credit for most of the work. The wire probes were used to clean the sap and sawdust from the entrance to each hole. These holes, by the way, are about the size of the head of an ordinary safety match. By means of the syringe, with its long and slender point, carbon bi-sulphide was injected into each hole and the hole immediately sealed with putty. Two hundred and fifty-seven holes in this one tree were treated in this manner over about a week's time in 1925. In the summer of 1926 the tree was found to be alive and thriving, but either a new crop of beetles or other beetles from another tree were at work. Sixty additional holes were then treated. Three hundred and seventeen beetle holes in a tree not more than ten inches in diameter! As the beetles work within the cambium layer and thus girdle the tree, one-thirtieth of that number of beetles would ordinarily have killed the largest and most healthy tree.

The difficulty and slowness of this treatment would absolutely preclude its use on a large scale, but there are thousands of property-holders throughout the country who have lost valuable trees adjacent to their homes whose shade and beauty they were relying on. To save these trees they would have gone to any amount of trouble had they known the course to pursue. The tree we saved in 1925 by treating and filling the two hundred and fifty-seven holes was, as I have stated, treated in 1926 for sixty additional holes. If larvae laid in the tree by the 1925 group of beetles,

"I got mighty tired o' hearin' that girl talk about her mountains bein' bigger'n our'n, when I knew they warn't, 'cause I heared the government folks from Washington when they wuz down here decidin' about the park say that the Smokies were the tallest mountains this side of the Rockies. I guided this girl up on Gregory Bald and up to Indian Gap, on the Carolina line, and up the Chimneys, and then up Le Conte, which folks say is higher'n anything east of the Mississippi 'cept Mt. Mitchell in Caroliny, which is only a teeny weeny bit higher. Up thar on top of Le Conte, where you can see into seven states, didn't that girl ask me 'Is this the highest mountain you got?'—sort o' throwin'-off like. And I just up on tole her, 'Why, we've got mountains so high we fix 'em on hinges an' let 'em down at night to let the moon pass by.' Atter that she kept a shet mouth."

How We Saved Our Tree from Insects

(Continued from page 482)

which numbered two hundred and fifty-seven, were controlled to the extent that only sixty holes were present the following year—and these holes might have been made by outside beetles—the carbon bi-sulphide treatment cannot be derided. Three hundred and seventeen holes in the trunk of a stunted tree not more than ten inches in diameter, meant that there was a hole through the bark for approximately every six square inches of the trunk surface. The tree was alive and thriving this spring, twenty-one months after the first holes were filled.

The attached photograph, taken this spring, shows many of the white putty marks and also the condition of the tree. Incidentally, there was not a single new beetle hole this year, while other trees in the locality were riddled.

Autos Kill Wild Life

A count of animals killed by automobiles on less than two miles of highway through the forests near Cathay, California, showed ninety-two snakes, eight birds, fifty-six squirrels, twenty-two rabbits and fifteen rats.

New York Would Protect Highway Foliage

Codification of laws affecting damage to trees, shrubbery and growing plants will be undertaken by the Westchester, New York, County Association of Justices of the Peace, in an effort to lessen the yearly toll taken in the county by motorists. The codification was discussed at the annual meeting of the association. Ornamental trees along the highways were given special mention in the resolution adopted. It is estimated that damage exceeding a million dollars is caused yearly by thoughtless motorists.

The New York State College of Forestry

Syracuse University
Syracuse, N. Y.

A FOUR-YEAR undergraduate course is offered in General forestry with the degree of Bachelor of Science and special courses leading to the degree of Master of Forestry, Master of City Forestry, Master of Science, Doctor of Philosophy, and Doctor of Economics; a four-year course in pulp and paper manufacture, and a short course each spring in dry kiln engineering and lumber grading are given. The State Forest Experiment Station of ninety acres at Syracuse, the Charles Lathrop Pack Experimental Forest of 1,000 acres at Cranberry Lake, the Charles Lathrop Pack Demonstration Forest of 2,250 acres in the Lake George-Warrensburg district, three other experiment stations, the Roosevelt Wild Life Forest Experiment Station, a modern pulp mill, a well-equipped sawmill, a complete dry-kiln plant, the biological laboratories, and an excellent reference library afford unusual opportunities for research and instruction. Students may elect work in nine different fields.

FRANKLIN MOON, Dean

Oregon School of Forestry

Located in the center of the last great stand of virgin timber in the United States.

Offers four and five-year courses in professional forestry, logging engineering, and lumber manufacture.

Field work in the magnificent Oregon forests, easily accessible from the school. The largest logging operations and lumber manufacturing plants near at hand.

Summer work readily obtainable in the Forest Service, in logging camps, and in the mills.

For catalog and further information, address

G. W. PEAVY, Dean
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Choosing a School

The schools whose advertisements appear in AMERICAN FORESTS AND FOREST LIFE are the leading forestry schools in their respective localities. They offer a well balanced curriculum and the inspiration of leaders in the profession of forestry.

Members may select from them with the full assurance that they are choosing from the best.

University of Maine

Orono, Maine

The Forestry Department offers a four-years' undergraduate curriculum, leading to the degree of Bachelor of Science in Forestry.

Opportunities for full technical training, and for specializing in forestry problems of the northeastern States and Canada.

Eight-weeks' camp-course required of all Seniors in Forestry, in practical logging operations in northern Maine, under faculty supervision.

For Catalog and further information address

JOHN M. BRISCOE
Professor of Forestry

Harvard Forest

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Massachusetts

A forest experiment station of two thousand acres, 19 years under management on a sustained yield. Large variety of silvicultural treatment in progress. Logging, milling, and marketing annually carried on. Extensive plantations established from the Forest nursery.

Competent graduate students accepted as candidates for degrees of M. F. or D. S.

RICHARD T. FISHER
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Forestry Training in the Heart of the Rockies

Colorado School of Forestry
A Department of Colorado College

Undergraduate and graduate courses in Technical Forestry. Forestry teaching in spring and fall at Manitou Forest (a 7,000-acre Forest belonging to the School), and the winter term at Colorado Springs.

Gordon Parker, Director
Colorado Springs, Colorado

Yale School of Forestry

Established in 1900

A graduate department of Yale University, offering a two years technical course in forestry leading to the degree of Master of Forestry.

Special opportunities are provided for advanced work and research in the laboratories and the school forests.

For further information and catalog address

The Dean of the School of Forestry

New Haven, Conn., U. S. A.

School of Forestry

University of Idaho

MOSCOW, IDAHO

Offers thorough training in Practical Forestry, preparing for federal, state and private work.

Four and Five Year Courses, leading to the degrees of Bachelor of Science in Forestry and Master of Science in Forestry respectively.

Opportunity is given to specialize in General Forestry, Logging, Engineering, and Range Management.

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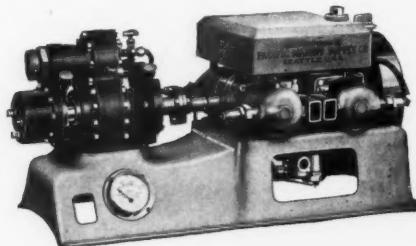
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